THE IRON AGE

New York, Thursday, April 12, 1906.

ALLIS-CHALMERS EXTENSIONS.

Additions to the West Allis Works, Milwaukee, Wis.

Extensive additions are being made to the West Allis plant of the Allis-Chalmers Company, Milwaukee, Wis., involving an expenditure of over $3,000,000, which, when completed, will add 861,000 square feet to the present floor area of 652,000 square feet. The additions under way include three machine shops, running east and west, parallel to the existing units, which will be known as Nos. 4, 5 and 6. Each of these buildings will be 575 feet long, and Nos. 4 and 5 will be 145 feet wide, while No. 6 will be 168 feet wide. The erecting shop, a view in which is shown in Fig. 1, is being increased 570 feet in length, and its dimensions when completed will be 113 x 1136 feet. This building runs north and south, and the adjoining six machine shop units open into it. The existing foundry, shown in Fig. 2, is 224 feet wide and will be extended 424 feet, making its total length 990 feet. The extension of the pattern shop and pattern storage building is the same length as the foundry, which will give this building a length of 990 feet over all and a width of 119 feet. Two buildings, the extension to the erecting shop and the pattern shop, have been practically completed, while substantial progress has been made on the remainder.

Fig. 1.—The Erecting Shop of the West Allis Works.

The site, situated in the town of West Allis, on the outskirts of Milwaukee, has a frontage of 1575 feet and runs back 2696 feet, or more than half a mile, giving more than 4,250,000 square feet of space, or 100 acres, adjoining the tracks of the Chicago, Milwaukee & St. Paul Railway. The general plan of the West Allis Works, as indicated in Fig. 3, embraces two sets of building units—one composed of those in which the work is common to every class of product, like the pattern shops, erecting shops and foundry, the other group comprising the machine shop units, where the work is specialized for various machine operations. The two groups of buildings lie at right angles to each other, those of general utility lengthwise of the plat, north and south. The machine shops, six units in all, run crosswise of the site, adjoining the erecting shop at the east end. Facing the ends of the machine shop units Nos. 1 to 6 is the foundry, extending north and south. The pattern storage building and shops stand farthest westward in the group and are parallel to the foundry building, with a distance of 98 feet between them. The extensions to the erecting shop, foundry and pattern shops are duplications of the existing units in practically every detail of construction.

Machine shop No. 4, which is typical of all six units, is divided longitudinally into two bays and subdivided crosswise by the framing into 36 bays, each 16 feet wide. The bay at the south side of the building is about 65 feet wide and 52 feet high to the bottom of the roof truss. The bay is served by a 50-ton crane, with a span of 67 feet and a lift of 44 feet. The adjoining north bay is 71 feet wide and 42 feet high from the main floor to the bottom of the roof truss and has a gallery floor about 26 feet above the main floor. This bay has a line of intermediate columns, making the north division 40 feet, with a runway for a 10-ton crane having a 38-foot span and a 17-foot lift. A mezzanine floor runs the entire length of the building except in the west bay, for lavatories, coatrooms and various service rooms, this floor being suspended from the gallery floor girders.

The gallery and mezzanine floors are made of thick planking set on edge. Skylights over each of the two principal bays extend the entire length of the building except over the end bays. Three elevators of the plunger type are installed, each surrounded by a stairway 6 feet wide to the mezzanine floor and gallery. Tracks extend from east to west through the erecting shop, entering the high bay of the No. 4 shop from the east end.

Machine shop No. 5 is identical with No. 4, but No. 6 differs somewhat in construction. This building is four stories high, built about a central court. The two principal four-story bays are about 53 feet wide and 72 feet high from the main floor to the bottom of roof trusses, with a total length of 576 feet, made up of 36 bays, each 16 feet long. These four-story bays will be connected at the west end for a length of 32 feet, or two bays, by a four-story building, and similarly connected at the east end, outside of the erecting shop, by a four-story building, one bay, or 16 feet long. The court will be roofed over, forming a one-story building in two bays. The total width of the building is 169 feet. A mezzanine floor in each of the principal bays, running their entire length, is 13 feet high and 12 feet wide, except in the bay at the west end. A runway is provided in the two outside bays for 10-ton cranes of 24-foot span and 17-foot lift from the floor. Similar crane runways are provided for the inside bays. At the sides of the mezzanine floors are runways for 3-ton cranes, 13-foot span and 17-foot lift. The arrangement of skylights, elevators, stairways and tracks is similar to that in units Nos. 4 and 5.

The original erecting shop had 24 bays of 23½ feet each and a total length of 566 feet. The principal bay is 72 feet wide and 72 feet high to roof trusses, and is served by a 75-ton crane with a 70-foot span and 60 feet from the floor. The extension, with few exceptions, is of the same construction. The bays are of the same width, 23½ feet, and nine adjoin shop No. 4, nine shop No. 5 and seven shop No. 6.

The foundry originally consisted of 24 bays of 23½ feet each and was 566 feet long. There are three principal bays in the cross section. The middle bay is 80 feet wide and 49 feet high to the roof trusses and contains a 60-ton crane with 78-foot span and 27-foot lift. The two side bays each have a width of 67 feet and are 31 feet high. The east bay has a 30-ton crane with 66-foot span and 24-foot lift. The west bay is divided by a line of columns into two sub-bays, one served by a 20-ton crane 35-foot span and 24-foot lift and the other occupied by sand platforms, core ovens, &c. Besides the overhead traveling cranes, the central bay and east bay are equipped with traveling jib cranes on both sides. All bays have central skylights interrupted by fan houses. The extension will be 18 bays of 23½ feet each, making an additional length of 424 feet, or 990 feet over all.

The existing pattern shop consists of a four-story pattern storage building, with an adjoining one-story pattern shop, both of fireproof construction. The pattern storage building is divided into three longitudinal bays, the middle one about 21 feet wide and the outside bays 20 feet. There are 36 transverse bays of about 16 feet each, making about 566 feet total length. The pattern shop is divided into two longitudinal bays of 27 feet each, with transverse bays corresponding to those in the pattern storage building. The entire building, storage and shop, is divided transversely into three equal parts by fire walls, with an elevator in each division of the storage building inclosed by a brick wall. Doors and windows have steel lintels resting on brick walls. Doors for all openings, including those in fire walls and at all elevator landings, have steel jambs. All doors are automatic closing, tin covered wood and fireproof. There are 504 windows in the storage building, all with galvanized iron frames, fitted with automatic closing devices and glazed with ¼-inch wire glass. The fireproofing of floors and roofs consists of concrete molded over girders, lintels, rafters and columns, completely inclosing all structural work and arched over between joists to form concrete floors and roofs. The extension consists of 27 bays, similar to those in the existing building, making a total length of 424 feet, divided into lengths of 14 and 13 bays by fire walls.

The power house occupies about a third of unit No. 3, at the west end and adjoining the blacksmith shop. The engine room, shown in Fig. 4, at the present time contains three Allis-Chalmers engines, as follows: One 23 and 36 x 42 inch Reynolds vertical cross compound en-

Fig. 2.—View in the Foundry.

gine, direct coupled to a 550-kw. 250-volt direct current generator; one 18 and 28 x 42 inch engine of similar type, direct coupled to a 300-kw. 250-volt direct current generator, and one Reynolds vertical 18 x 24 inch engine, direct connected to a 100-kw. direct current 250-volt generator. In addition there is a horizontal two-cylinder tandem Nurnberg gas engine of the four-cycle double acting type, driving a 150-kw. direct connected direct current generator, and a cross compound two-stage Allis-Chalmers air compressor, with a capacity of 1000 feet of free air per minute, supplying air at 100 pounds pressure, for use in pneumatic tools and air hoists in the works and for air lifts in the artesian wells.

The new equipment for furnishing the additional power required by the extensions consists of one 34 and 54 x 42 inch Reynolds vertical cross compound engine, direct connected to a 1000-kw. Bullock direct current generator, and an Allis-Chalmers cross compound air compressor with air cylinders 18 and 30 inches, steam cylinders 18 and 30 inches and a 42-inch stroke.

In the boiler house five Edgemoor tubular boilers with a total aggregate horse-power of 3293 and a heating surface of 6586 square feet each will replace five Reynolds 96-inch vertical tubular boilers, aggregating 876 horse-power, which will be installed at the Reliance works. The new boilers will be operated in connection with Jones underfeed stokers. A stack 175 feet high and 8 feet inside diameter furnishes natural draft.

The heavy machine tools of various kinds installed in shops Nos. 1, 2 and 3 will be duplicated for Nos. 4, 5 and

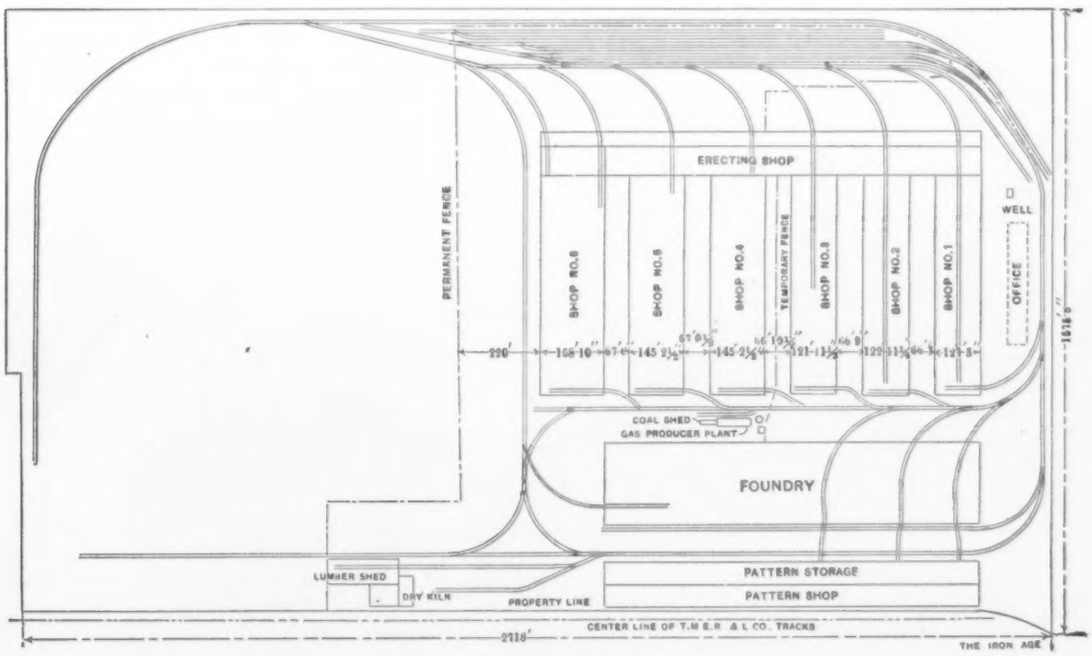


Fig. 3.—Plan of the West Allis Works with the Extensions.

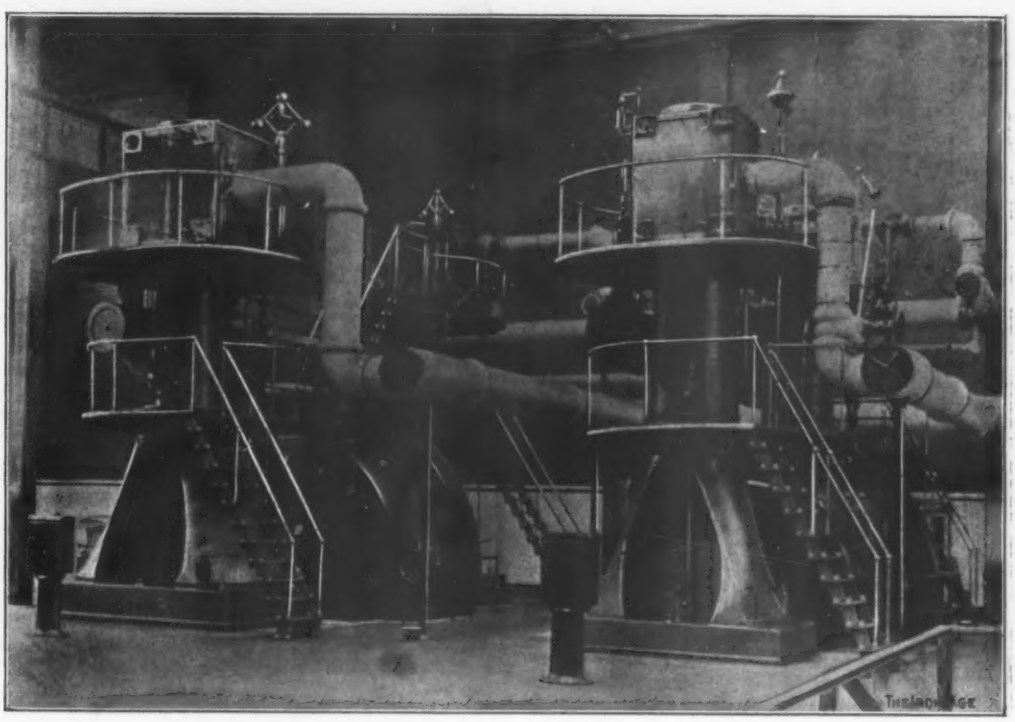


Fig. 4.—View in the Power Plant.

6, and supplemented by tools suitable for specific service, as, for example, the building of steam turbines and turbo-generators, gas engines, &c. One order recently placed covered 42 machine tools of extra heavy pattern, costing in all $550,000. These tools were all designed especially for use with high speed steels and will be driven by Allis-Chalmers motors. The combined weight of these tools with the motors used for driving them aggregates 2141 tons. Fourteen of the new machines are vertical boring and turning mills from 8 to 16 feet and extra heavy in design. There are five standard shaft lathes and two crank shaft lathes, with a swing of from 60 to 125 inches and 30 feet between centers; eight planers of various sizes, all of which are of the spiral geared type; a 260-ton armature press, also several drilling and boring machines, slotters, &c. Over 1200 horse-power in Allis-Chalmers motors will be required to drive the new equipment. In addition to the machine tools, 34 electric traveling cranes have been ordered for sizes and capacities ranging from 2½-ton wall jib cranes to 60-ton 78-foot span cranes, with 10-ton auxiliary hoists for the foundry extension.

The system used for storing patterns and which renders each readily available for use when required is greatly simplified by the use of electric telephers running through the various sections and by push cars and elevators. The telephers are supported on overhead I-beams and have a capacity of 3 tons each.

Direct current of 250 volts is distributed throughout the building for operating motors driving machine tools. These motors are largely operated on the Ward Leonard multiple voltage five-wire system (Bullock system of control for variable speed motors), making 27 different speeds possible for each machine.

The heating system utilizes exhaust steam passed through a closed heater, corresponding to the primary heater in a condensing system. An auxiliary live steam heater is provided to operate in connection with the exhaust steam heater for cold weather. The hot water thus obtained is circulated through the works by two centrifugal pumps electrically driven. The total space to be heated is 26,000,000 cubic feet, requiring 500,000 feet of 1½-inch hot water pipe. Water for all purposes is obtained from four artesian wells located on the property, pumped automatically by motor driven deep well pumps through 8-inch pipes to cisterns near the power house. These cisterns are of concrete, each of 100,000 gallons capacity, with steel concrete roofs. A pressure of 100 pounds is kept on the mains at all times, which can be raised to 140 pounds.

The yards between the various shops are as completely equipped with cranes as the interior of the buildings, the storage space thus made available proving very serviceable. Seven cranes are provided for use between the various machine shops and the foundry and pattern shop.

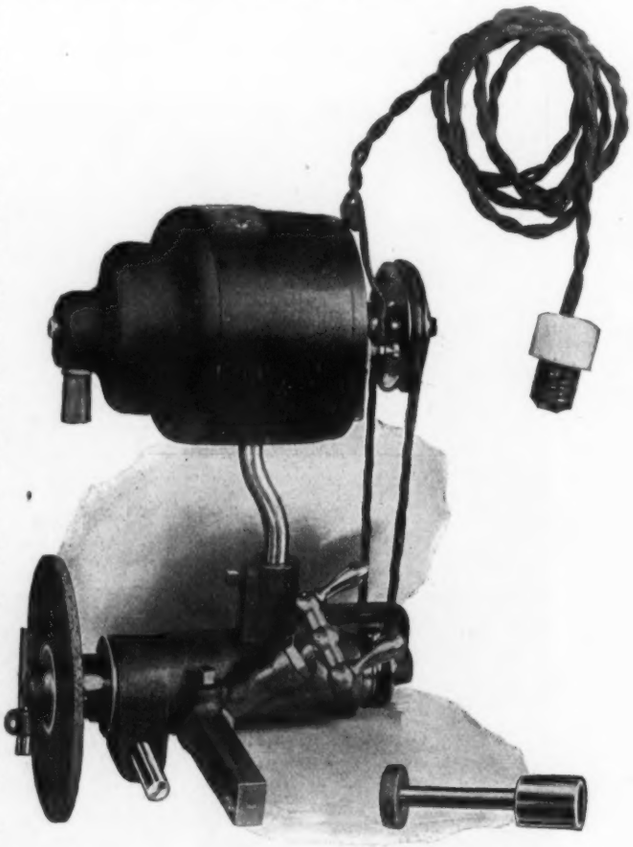
The entire plant will afford employment to 11,000 men and will make the West Allis works one of the largest industrial plants in the West. This plant, together with other works of the company located in Milwaukee, Chicago, Cincinnati and Scranton, will be capable of giving employment to a total of approximately 18,000 men.

At the new steel works of the Cargo Fleet Iron Company, Ltd., Middlesbrough, England, at which the Talbot open hearth steel process has been in use since October, 1905, two furnaces of 175 tons capacity are in operation and the third is expected to start soon. Four 200-ton Talbot furnaces are to be erected at the South Durham Steel and Iron Company's works, Middlesbrough, the contract being already let. Work is also under way on a plant for Palmer's Shipbuilding Company, Ltd., at Jarrow-on-Tyne, England, where two 175-ton furnaces will be installed.

The estate of the late Peter L. Kimberly of Sharon, Pa., has been appraised, and it is thought that the total will be between $12,000,000 and $15,000,000. Mr. Kimberly was one of the organizers of the Republic Iron and Steel Company, and was for a large part of his life one of the most prominent iron men of the Shenango Valley.

The Coates Grinding Attachment.

The motor driven grinding attachment shown in the illustration has a wide latitude of work. Its motor is mounted upon a post, independent of the grinding attachment, the weight coming upon the outside of the spindle casing, which is held by the tool post support and relieves the spindle of stress. The main spindle, driven by a belt from the motor shaft, has a double telescopic feature, which allows a 3-inch axial movement, effected by a hand wheel through a spiral rack and pinion. To provide the telescopic feature there are three spindles, one within the other. The intermediate spindle is fastened direct to the driving pulley, the other two telescope. The interior spindle is splined to the intermediate and the outside spindle is splined to the casing and



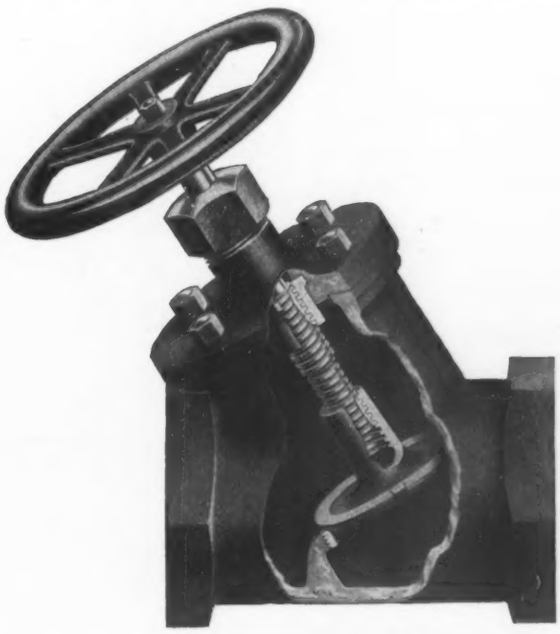
A Motor Driven Grinding Attachment Made by the Coates Clipper Company, Worcester, Mass.

does not revolve. The driving spindle runs in hardened steel cone bearings. The attachment is manufactured by the Coates Clipper Company, Worcester, Mass.

A Steam Turbine in Siam.—One of the most progressive of the independent principalities of Asia is the little kingdom of Siam on the Indo-Chinese Peninsula. In the principal city, Bankok, is a modern electric railway power plant, operated by the Siam Electricity Company, and equipped with reciprocating engines and generators. Because of the increased demand for power an additional unit has become necessary, and a Curtis steam turbine has been decided upon as most suitable. This is a 500-kw. 575-volt machine, built by the General Electric Company, New York. The boiler plant for this station is unique in that paddy husks are burned in place of coal. The fuel is brought down the river from the rice fields in flat bottomed boats to the power house and unloaded directly into the boiler room by an elevator and belt conveyor, built by the Link Belt Engineering Company, Philadelphia, and operated by several direct current 500-volt General Electric Company motors of the CE type. This method of using rice husks for fuel is an economic utilization of a waste product similar to the use of the crushed sugar cane, or bagasse, on sugar plantations.

The Eurema Y Valve.

An example of the iron body Eurema Y valve made by the Western Tube Company, Kewanee, Ill., is given in the engraving. Its special features are the stem, disk and seat. The stem is a differential screw of low pitch which rises half the distance of the opening, permitting the use of the valve where space is limited, and also insures against its opening by vibration. The bonnet of the valve is fitted with a brass bushing for the screw of the stem, and on account of the very short rise of the stem no yoke is required. The brass disk and seat are spherically ground, so that a tight joint will always be made and maintained. Valves of this pattern are made in from 2 to 8 inch sizes.



The Iron Body Eurema Y Valve Made by the Western Tube Works, Kewanee, Ill.

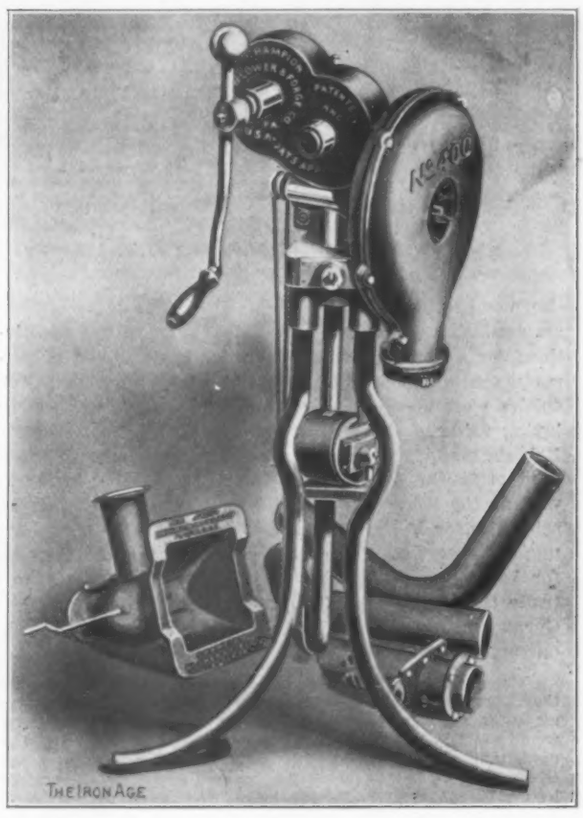
In sizes of from ⅜ inch to 3 inches the valve is made with straight screw and steam metal body for handling steam, water or air at moderate pressures, and in sizes from ⅜ inch to 2 inches it is made with a high duty metal body, particularly intended for high temperatures, corresponding to pressures of from 150 to 175 pounds.

One object in the design of the Eurema Y valve was to obtain a near approach to gate valve capacity at a cost no greater than that of a globe valve. Compared with a globe valve it has the advantages that the passage through the seat is straighter, reducing friction, and that the inclination of the seat prevents accumulation of sediment. When grit or scale collect on the seat of the globe valve the valve cannot close tight, and the disk may be injured by an attempt to force it shut. The positioning of the seat also has an advantage, in that it is firmly and uniformly cast to the body of the valve and is not subject to unequal expansion. The peculiar shape of the diaphragm of the globe valve causes one end of it to expand in one direction and the other end in the opposite direction, the result of which is a tilting of the seat likely to cause leakage. With an angle valve or a Y valve this is not true, as the support of the seat is wholly below the disk, and such expansion as occurs is in one direction only. For this reason the Y valve is less likely to leak under high pressure than a globe valve, as demonstrated by tests of the valve in actual use. It is stated that the valves have remained tight for a long time on pipe lines where globe valves were formerly used and where it was necessary to replace them at frequent intervals on account of leakage. A point which is made by engineers who have used the Y valve is that it can be placed at the end of a run of pipe as a shut off or as a blow off valve, and as the water carries considerable foreign matter the valve can be cleaned out by a wire much more easily and completely than a globe valve.

The slant of the stem shows at a glance the position in which the valve should be placed to close against the pressure. With globe valves it is necessary to look inside to determine the correct position and this precaution is sometimes omitted, and the valve placed improperly in the line. Still another advantage mentioned is that the design gives greater strength in proportion to weight than does that of a globe valve. While the valve illustrated has been on the market only a short time it is not an experiment, as it has been thoroughly tested in the company's plant and elsewhere, and is claimed to be a practical success.

The Champion Electric Blacksmith Blower.

The new feature in the No. 400 Champion steel blower, shown in the accompanying illustration and made by the Champion Blower & Forge Company, Lancaster, Pa., is the combination of means for driving it by a motor as well as by hand. In other respects the blower conforms entirely to the company's regular No. 400. It is ball bearing throughout and has the same high speed spiral gear drive, the hand driving gear, however, being so arranged as to be easily disconnected when the motor is to be used for driving. The power from the motor is applied direct to the fan shaft, and when the motor is in operation the crank gears and all others except the spiral gear are motionless. The electric motor is located, as shown in the engraving, on a bracket between the tripod legs of the blower, and is especially made for this particular work. Motors are furnished for either direct or alternating current of 110 or 220 volts. Direct current 500-volt motors can also be supplied if desired, but the lower voltages are recommeded for general work. The blast is regulated and controlled by a blast gate and the blower is suitable for all classes of work. The new "Whirlwind" blast anticlinker, heavy nest tuyere iron and piping are furnished with the new type blower. The fan is 12 inches in diameter and the machine complete weighs about 175 pounds.



The No. 400 Champion Blower with Combined Hand and Motor Drive.

British Tube Combine Halted.

A movement has been well under way in Great Britain recently for a selling combination in the steel tube trade. A pool existed a few years ago and lasted for a year, when it developed that some of the Scotch members were not maintaining prices. On the dissolution of the pool some of the members declared they would never again be parties to such an agreement, and there was sharp competition in the trade until the fall of 1905, when accumulating demand carried prices up. In the negotiations for a new agreement the price basis talked of represents an advance of 30 to 40 shillings a ton. But difficulties were encountered, which have at last caused the laying aside of the project for the time being. Certain British manufacturers who market the bulk of their product in the export trade insisted that that trade as well as the home trade should be covered by the agreed schedules, or if the foreign market was to be open such manufacturers wanted a money allowance from the pool for keeping up prices in Great Britain. In the export trade they meet severe competition from American and German manufacturers, particularly the former. Of the outcome of the matter the London *Economist* says:

> They sounded the American producers as to the attitude they were disposed to take toward a British combine in foreign markets; and the former are said to have stated that they would not join in a hard and firm agreement, but they would cooperate in sustaining prices if they received a guarantee that the British, especially the Scotch, makers would stand honorably by the bargain, and would not, as in the past, become undercutting competitors. This guarantee, it appears, cannot somehow be forthcoming, and as the majority of the producers will not meanwhile concede anything to the large export makers proceedings have come to a deadlock. But it does not follow that the difficulty will not ultimately be overcome. The home market takes up about 80 per cent. of the make which the home makers proper produce, and the prices which a combine would be enabled to enforce offer a bait too tempting to be cast aside without a strong effort being made at a compromise.

At the recent annual meeting of Hadfield's Steel Foundry Company, Ltd., Sheffield, England, a resolution was passed authorizing an increase of £100,000 in the capital of the company. The chairman, R. A. Hadfield, said that in the past six years the dividends of the company had averaged 22½ per cent., making a total return to the stockholders in that time of 135 per cent. Allusion was made to new lines of manufacture in which it was expected an important demand would develop in the near future.

Rolling Mill Drive Construction.

H. Ortmann of Voelklingen, Germany, in an article appearing in *Stahl und Eisen*, expresses the opinion that the constructive details of rolling mills have, until quite recently, been neglected by both mill men and machinery builders, little apparent interest being taken in the durability and safety of such parts as pinions, spindles, couplings, &c. When worn out they were replaced and however frequently such renewals were required they were regarded as inevitable, as was also the racket of ill-fitting spindles and couplings. In the accompanying illustrations, reproduced from Mr. Ortmann's article, old and new designs are shown.

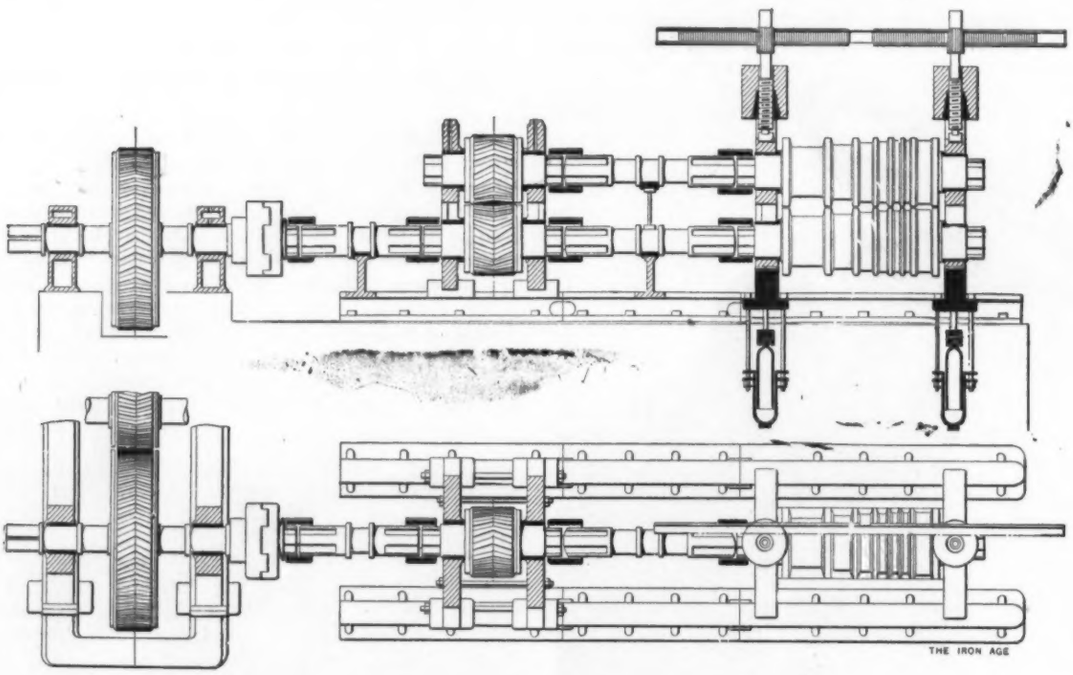


Fig. 1.—Older Type of Blooming Mill Drive, in Elevation and Plan.

Faulty Couplings.

If the reversing mill shown in Fig. 1 is examined it will be seen that on the engine shaft is a so-called crab, the wabbler of which fits into a coupling. In the latter is one end of the leading spindle, while the other end is connected to the pinion wabbler by another coupling. On the other side of the pinions the arrangement is similar, so that there are eight wabblers subjected to wear, all of them being made as short as possible.

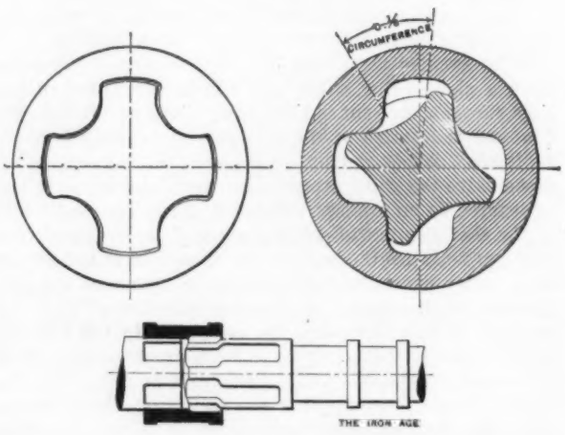


Fig. 2.—Worn Coupling and Wabbler.

In Fig. 2 are shown a badly worn coupling and wabbler which have been in use some time, the illustration being an exact reproduction. Despite their condition they are not yet entirely useless and will, therefore, be used

further. In reversing this wabbler, about one-eighth of a revolution is necessary to bring the other flank into contact, so that if there are eight such on the mill a complete revolution of the engine shaft is made before motion is imparted to the rolls. If the jack-shaft is geared to the crank shaft in the ratio of 1:2½, the latter must make two and one-half revolutions before the lost motion of the spindles is taken up.

This is not an extreme case, as engines are often seen which make two or three complete turns before the mill starts. Such a state of affairs of course results in an enormous loss of steam, and it is plain that the expense for spindles, couplings and pinions (for the latter must be replaced when their wabblers are worn out) is very great. The design of the pinion stand in the mill illustrated was such that it was impossible for the pinions to work properly; the bearings wore very quickly and needed to be constantly adjusted with liners, so that the teeth could not mesh together as they should.

A Modern Method of Coupling.

Fig. 3 shows a more modern arrangement, in which the pinion housing is made a part of the engine bed plate. Only two couplings are necessary, each with one long end firmly secured to the pinion wabbler, the other end being on the spindle, so that there are only two other wabblers subject to wear. The design, too, of this wabbler is better than in earlier mills, with the result that after four years' constant work only one coupling needed replacing, all other parts being completely intact. With a mill of the older kind no one would have cared to risk carrying but one spare spindle and coupling in stock, as was done here. The pinions are so arranged that the bearings cannot wear and their housing is held in such manner that the turning moment of the engine shaft is not transmitted through the foundation.

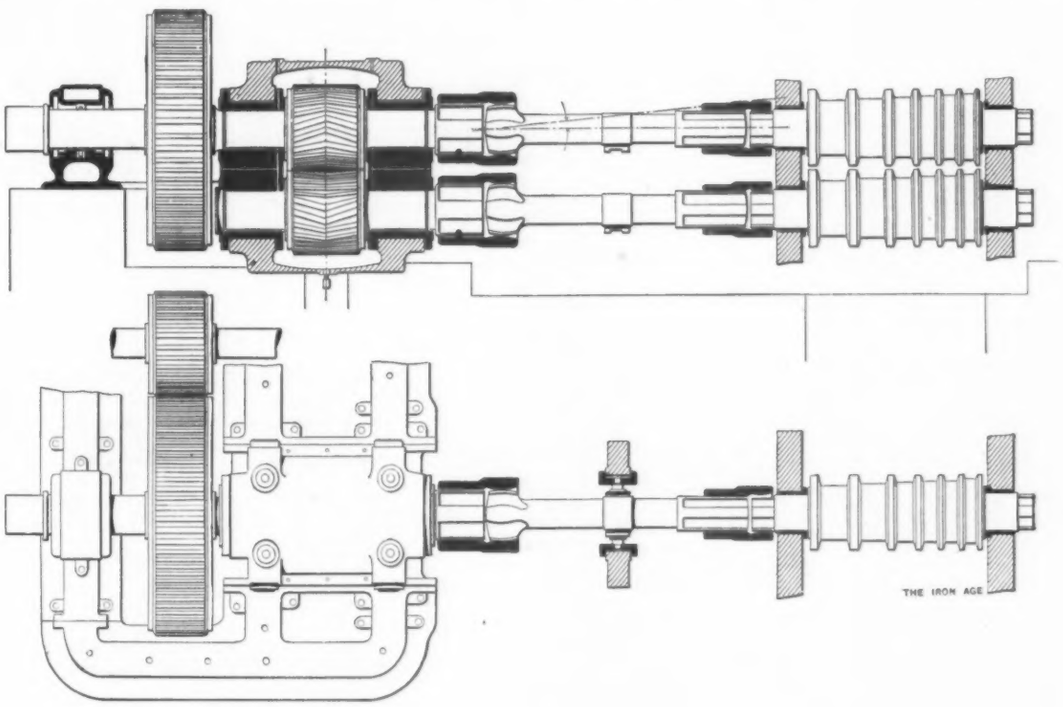


Fig. 3.—Modern Blooming Mill Drive, in Elevation and Plan.

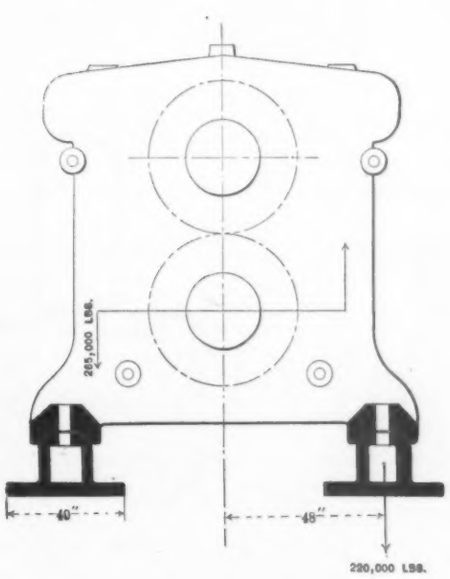


Fig. 4.

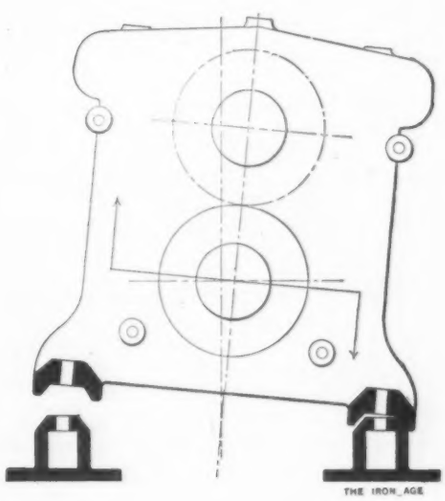


Fig. 5.

Diagrams Illustrating the Tendency to Turn of Old Type Pinion Housings.

Bad Pinion Housings.

Figs. 4 and 5 show how pinion housings of the old type tended to turn. The foundation between such a

housing and the engine had to resist this tendency and each side of the floor plate was alternately in tension and compression. The reason why nearly all pinion housings in reversing mills become loose on the foundation is very easily explained. The turning moment of the engine shaft is transmitted to the pinion housing foundation plate, exerting there a strain of about 220,000 pounds—on one side in the form of pressure and on the other as tension on the foundation bolts. A changing strain of this kind should not exceed 14.2 pounds per square inch, but allowing 17 pounds, the floor plate, if 40 inches wide, would need to be 25 feet long. If 20 feet long, the strain would be 24 pounds per square inch. It is clear that in either case the pressure would not be distributed equally along the whole length. It would be better to place the plate at right angles to the rolls. Experience has shown that in practice these floor plates become loose, whereas in the more modern construction shown in Fig. 3 this trouble is completely avoided.

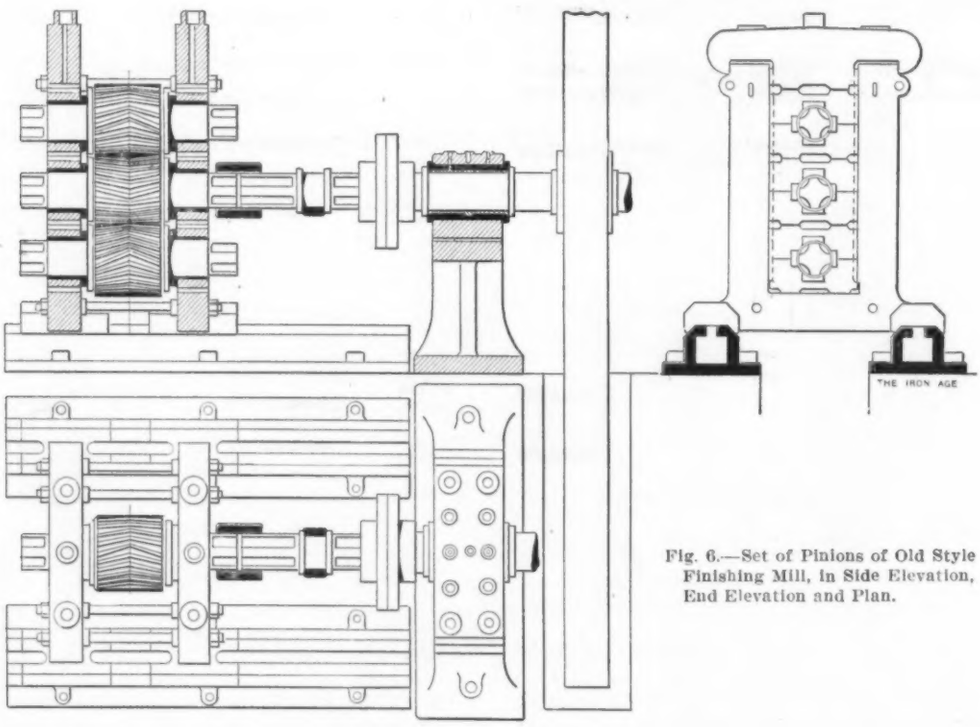


Fig. 6.—Set of Pinions of Old Style Finishing Mill, in Side Elevation, End Elevation and Plan.

The Design of Pinions.

It is astonishing how little care has been expended on the design of pinions. Every engine builder of the present day knows enough to design bearings of ample length and journals of sufficiently large diameter. Only in rolling mills where enormous strains are unavoidable has this been regarded as unnecessary. In Fig. 6 is shown a set of pinions for a finishing mill of the old style, and in Fig. 7 a modern design for the same purpose. A comparison will show at once that the latter will far exceed the former in durability. The pinion housing is built on the same bed plate as the outboard bearing of the engine. It is advisable to make the distance between them as short as possible, in order that the bed plate may have the necessary strength without being too heavy. The latter need not extend far in line with the rolls, but should have ample dimensions at right angles to them. The holding down bolts and foundation bolts should be as far as possible from the center line, as the bed plate must take up the whole of the turning moment. A connection between that bed plate and the bed plate of the roll housing is unnecessary, as the turning moments of the two spindles balance each other.

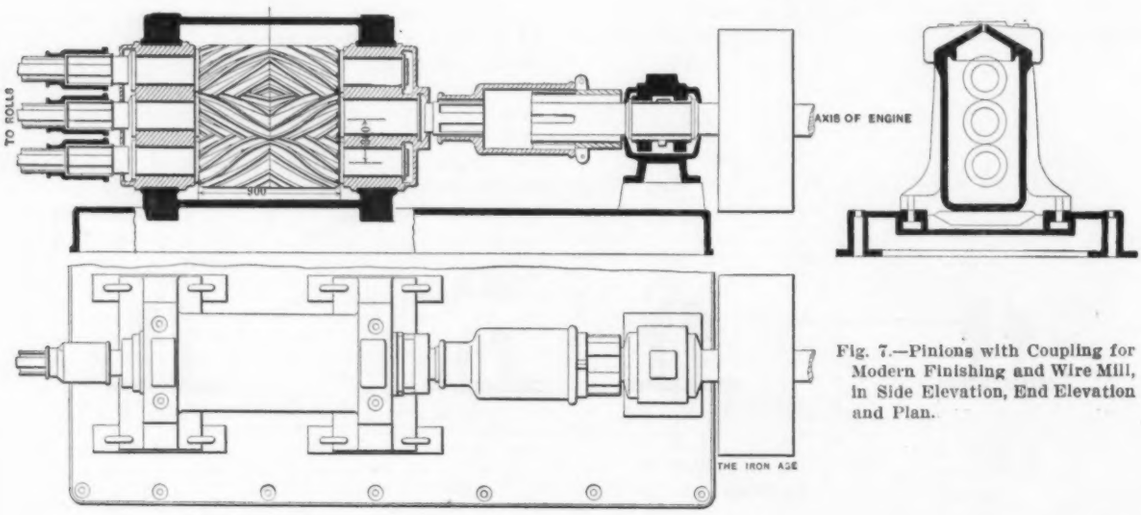


Fig. 7.—Pinions with Coupling for Modern Finishing and Wire Mill, in Side Elevation, End Elevation and Plan.

Couplings Which Avoid Numerous Wabblers.

Figs. 8 and 9 show designs for other couplings which avoid the numerous wabblers and render a spindle carrier unnecessary. The massive spindles of older mills had the disadvantage that if they were fractured an axial pressure was exerted, in some cases strong enough to

push the engine shaft out of place and break part of the engine. By the use of a simple coupling such danger can be avoided. Should such a fracture take place in connection with a fly wheel engine the pieces would simply be thrown off.

Fig. 8 shows the pinion wabblers of a fairly large mill, 30 inches, provided with collars, the object of which

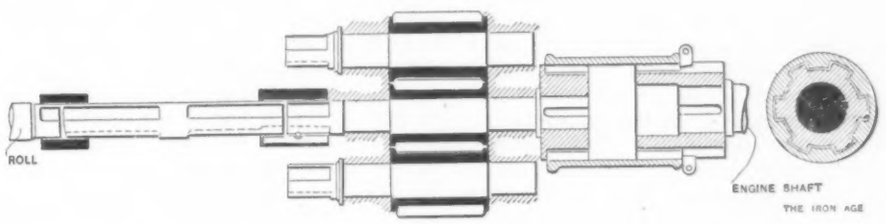


Fig. 8.—Modern Pinion Drive, with Coupling.

is to take up axial pressure which might arise from the spindles working at an angle when using rolls which were considerably worn. It will be noticed also in this drawing that the couplings are firmly secured to the pinion wabbler and that the spindle only can move in the coupling, the object being greater durability of the pinion shafts. In older mills there is not, as a rule, sufficient

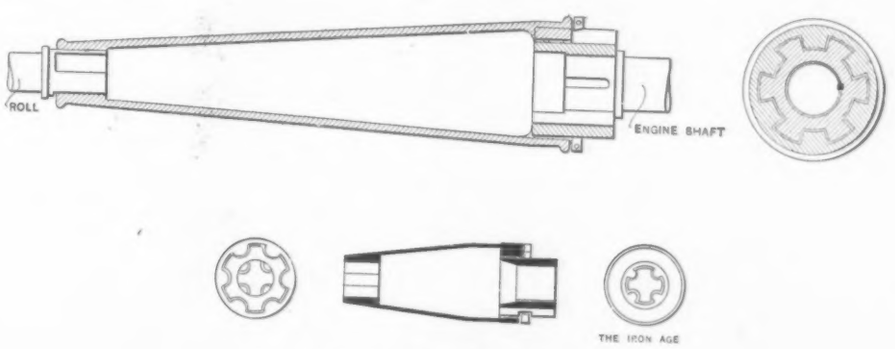


Fig. 9.—Modern Couplings.

room to install correctly designed pinions and this has led to the removing of the leading spindle and crab and the use in their stead of a coupling similar to that shown in Fig. 8. By this means sufficient room is obtained to install a set of pinions which, if not the best, are at least fairly durable. If there is no pinion stand between the engine and the rolls and a hollow spindle without carrier is used, it is advisable to place a breaking collar behind

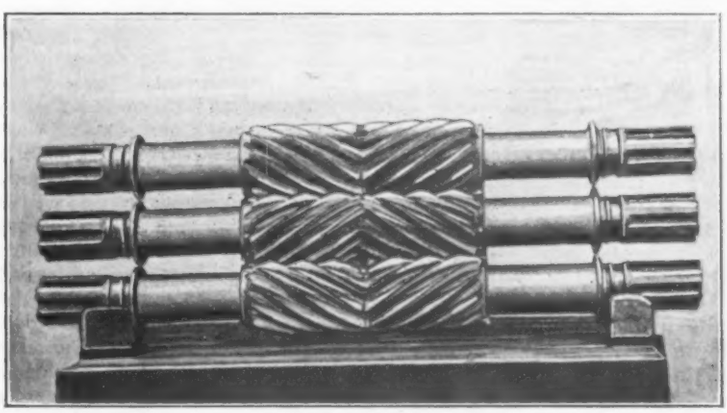


Fig. 10.—Wide Pinions.

the coupling, so that if undue axial pressure arises from the rolls the collar will break and prevent damage to the engine.

Wide Mill Pinions.

It has often been stated that mill pinions should be limited in width, as otherwise they would not work quietly enough, and would be particularly unsuitable for rod mills. Fig. 10 shows a set of pinions which will prove the contrary. These have a diameter of 10 inches, with teeth 40 inches wide. They run very well; have been in use some time, and to-day are so little worn that it is impossible to prophecy as to their durability. It is correct here, as with all other gears, to make the teeth as wide as possible compared with the diameter, and not to hesitate if at first the dimensions seem extraordinary. For finishing mills cut teeth are to be recommended. Furthermore, the heat which is caused by friction and which is taken up by the lubricant should be carried away, either by means of cooling plates, by spraying the housing, or by a circulating system which includes some arrangement for cooling the oil. The latter is to be recommended, as it is then possible to filter the lubricant at the same time.

Clutch Couplings and Breaking Parts Unnecessary.

The view is still widely prevalent that in small mills a clutch coupling is necessary, which can be thrown out of gear should anything go wrong in the mill, thus stopping the latter while permitting the engine to run. Such sudden stoppage usually results in a broken spindle or coupling without any compensating advantages, for it is generally effected too late to prevent the threatened trouble at the rolls. At the Voelkingen mills the use of such devices was discontinued seven years ago without trouble resulting.

Another error, still found in many reversing mills, is that breaking spindles or breaking couplings must be used. That this is unnecessary will be seen at once by considering that in such a mill there is no moving mass to be brought suddenly to a standstill. If all parts of the engine and mill are, therefore, strong enough to withstand the turning moment when rolling it is impossible to cause a fracture by sudden overload at the rolls. In such a case the engine simply comes to a stop, and no purpose is served by making use of parts which would break if subjected to a greater strain.

The American Gas Company of Pittsburgh has taken over the Manufacturers' Gas Company of Kittanning, Pa., paying $45,000 for it. It is said that all of the natural gas interests in the Kittanning district are to be consolidated.

THE LONG ISLAND CITY POWER STATION.—II.

In the last issue a brief outline was given of the Pennsylvania Railroad Company's proposed extensions, which will include a terminal in New York City and connections with New England and Long Island. The electric current to furnish the power will be supplied from two plants, one in New Jersey, yet to be built, and the other on Long Island. The previous article described the latter station, covering its location, capacity and design, the steel construction, equipment, coal and ash handling, water supply and steam generating plant, and the account is continued in the following:

Steam Turbines.

The initial equipment comprises three main generating units consisting of steam turbines direct connected with three-phase 11,000-volt generators of the revolving field type. The turbines are of the Westinghouse-Parsons single flow pattern, rated to develop 5500 kw. at 175 pounds steam pressure, and 27½ inches vacuum, running at 750 revolutions per minute. The turbine and generator are mounted on a heavy bed plate, which rests upon the foundation, but it is not fastened with anchor bolts. The length of each turbo-generator unit is 47 feet; width, 13 feet, and hight, 14 feet to the top of the gallery railing. A four-cylinder piston engine of equal capacity, with its generator would occupy a floor space about 35 feet wide and 39 feet high.

The parallel operation of alternating current generators requires close speed control. The governors are of the Westinghouse-Parsons pattern, capable of accurate speed regulation, and may be seen in the view given in Fig. 5. The setting of the governor is altered by operating a motor which changes the position of the weight on the rocker. The motor is controlled by a switch in the electrical operating gallery, and the switchboard attendant, when about to throw machines in parallel, manipulates this speed changing device until synchronism is obtained. The turbines are also fitted with safety stops which shut off the steam supply automatically if the speed exceeds the predetermined limit. Another device controls the action of the relief valve in the outboard exhaust connection. On the boiler room wall, convenient to each turbine, there is a stop valve, by which the steam supply to each turbine can be cut off in the boiler room without leaving the engine room floor. An iron gallery extends across the tops of the three turbine units, affording access to the admission and by-pass valves. The turbines were built at the East Pittsburgh works of the Westinghouse Machine Company.

Each turbine is provided with a separate condenser of the counter current surface type, built by the Alberger Condenser Company, having 20,000 square feet of cooling surface. The condenser is placed in a large arch opening in the turbine foundation. The entire condensing plant, consisting of condenser, circulating pump, dry air pump and hot well pump, may thus be compactly grouped within and about the base of the foundation. The exhaust steam enters the condenser at the bottom, the dry air pump exhausts the vapor at the top and water of condensation is collected from the bottom by the hot well pump. The circulating water enters the tubes at the top, makes three passes, and is discharged from the bottom into the overflow flume directly underneath. The condensing water is lifted from a well connecting with the intake flume, by a 24-inch double suction centrifugal pump made by the Morris Machine Works. It is capable of pumping 20,000 gallons of salt water per minute against a head of 20 feet. Each pump is driven by a direct connected 12 and 24 x 12 inch Westinghouse compound engine.

The condensed steam is drawn from the bottom of each condenser and discharged to the hot well tanks in the boiler room basement by a 4-inch centrifugal pump direct connected to a 15 horse-power, 220-volt, direct cur-

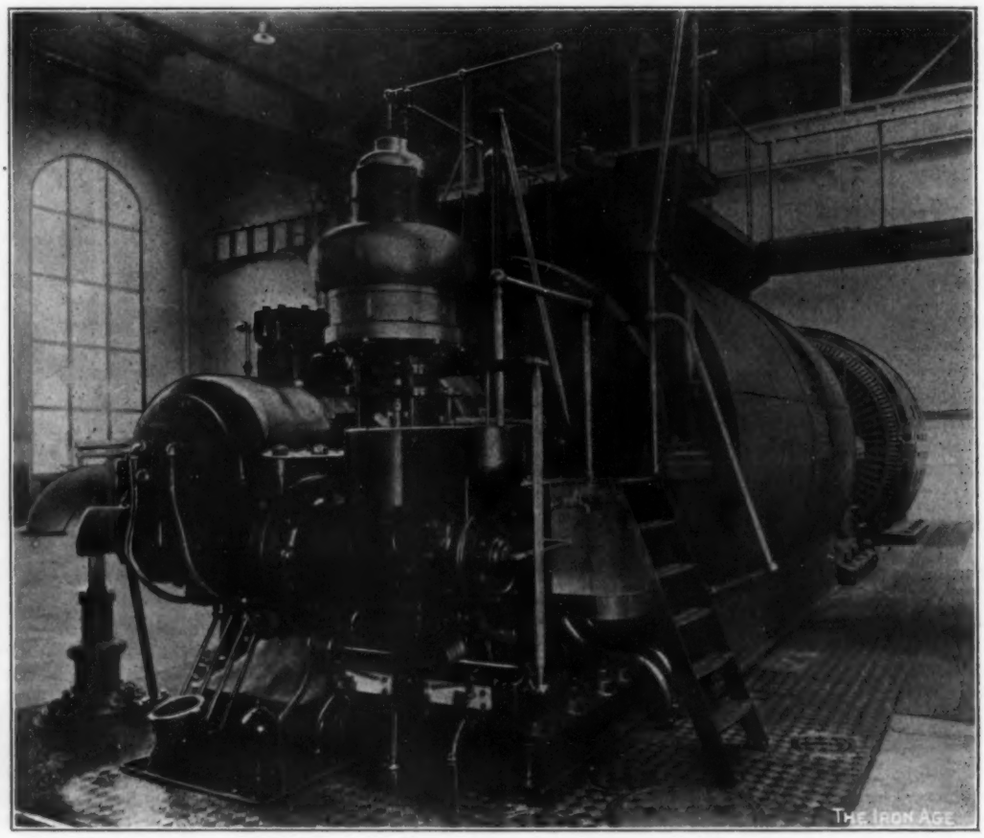


Fig. 5.—One of the Generating Units Taken from the Steam End.

rent motor. A by-pass arrangement for the overflow flume is provided for discharging the condensed steam directly into the flume if desired. Vacuum is maintained in each condenser by an Alberger horizontal steam driven two-stage dry vacuum pump, with 10 and 24 inch steam cylinders and 24-inch pump cylinders, with a 24-inch stroke.

An unusual provision has been made to protect the condenser tubes from deterioration due to electrolysis, occasioned by the galvanic action of salt water on the tubes, aggravated by stray currents from the ground. The connections to the city piping are through two 14-inch branches and on account of the proximity of the water mains to trolley tracks all over the city there is a tendency for stray currents to flow into the piping of the building and thence to the condenser intake, returning through the river to the negative bus bars of some neighboring street railway power plant. To prevent the electrolytic corrosion which would be certain to follow in the condenser tubes, a shunt circuit is provided between the incoming water pipes and the condenser flume to divert as much current as possible from the condensers. To neutralize such currents as might still find their way to the tubes a small motor driven booster is used. The positive pole of the booster is connected to the heavy grounded shunt cable, and the negative pole to seven different points on each condenser, there being an adjustable rheostat in each of these branches to adjust the superimposed voltage to exactly counterbalance the natural galvanic electromotive forces due to the brass tubes, the iron shell and the circulating water, together with the stray electromotive forces from outside. With these destructive potentials counterbalanced the condenser is in a neutral electric state, which effectively prevents corrosion and pitting of condenser tubes and sheets and secures a longer life for this highly vulnerable section of the steam equipment.

Piping.

The piping systems may be divided as follows: Main or superheated steam, auxiliary or saturated steam, main exhaust from turbines to condensers and atmosphere, dry air pump connections to condensers, auxiliary exhaust, boiler feeding system, blow off piping, drip piping, general water supply, fire protection, lubricating oil circulation, compressed air cleaning system and drainage. In the order of their importance the considerations in the laying out of the piping were safety, efficiency, simplicity and flexibility.

The main or superheated steam piping allows four boilers on each floor, or eight altogether, to feed directly to a separate generating unit, with a cross connecting header located back of the first floor boilers, joining these separate feeders and fitted with suitable stop valves. On account of the high temperature of the superheated steam it is necessary to allow for excessive expansion, and long radius pipe bends were used throughout. The main steam piping is full weight steam pipe, with extra heavy welded steel flanges. The fittings are of special pattern and are of open hearth cast steel. In one situation there are four 7-inch boiler connections entering one 12-inch main. The valves used on this section of the work were specially designed and are of semisteel, with integral seats and special stuffing boxes. Gate valves were used except at the boiler nozzles, where automatic reverse current stop and check valves were provided. In making up joints steel bolts and corrugated copper gaskets were employed.

The auxiliary or saturated steam system supplies the reciprocating steam driven auxiliaries, including the boiler feed pumps, circulating and dry air pumps, stoker engines and all the pumps on the various water and oil systems distributed throughout the station. This piping is also laid out on the unit system.

The main exhaust system from turbines to condensers and atmosphere embodies a 36-inch exhaust connection for each turbine leading above the roof of the building. This becomes operative through a horizontal relief valve hydraulically operated, the dash pot and operating gear being worked from the engine room floor. The upper end of the atmospheric exhaust pipe is fitted with a Stein exhaust head. The exhaust from the reciprocating pumps at various parts of the basement goes to an open heater. The heaters are situated at the west end of the pump room and are connected so that they can readily be by-passed. From the closed heaters the feed water passes through risers to a loop over the first floor boilers, thence to the economizers. From the economizers the water passes into another loop above the first floor boilers, whence it is distributed to the individual boilers.

The dry air pump connections to condensers include two 6-inch pipes from each condenser to an 8-inch header located above the dry vacuum pump, and from this header there is an 8-inch connection to each pump. A valve is placed in each of the branches to pumps and condensers and the headers are also subdivided by valves so that each pump with its section of header may serve a single condenser or may pump air from any other condenser. The discharge from the air pump is carried into a common header which connects into the outboard exhaust provided for the two 2500-kw. lighting units, through which it is carried to a Stein exhaust head above the roof.

The auxiliary exhaust piping is divided primarily into two systems—one from the single acting engines which drive the condenser circulating pumps and the other from all other auxiliary apparatus. The first system leads directly to the closed feed water heaters in the boiler room basement and has a cross connection to the second system of piping, which system leads directly to the large open heater located on the first boiler room floor, for the purpose of raising the temperature in the make-up water.

The normal feed water supply to the boilers comes from the hot well or storage tanks, which receive their water from the main surface condensers. The water is taken from the tanks by four boiler feed pumps installed in a pump room in the center of the basement. These pumps are of the outside packed plunger pressure type, of Epping-Carpenter make, with compound steam ends, steam cylinders 14 and 22 inches in diameter, water cylinder 12 inches in diameter, and 24 inches stroke. In case of emergency the pumps suck directly from the water supply mains. They discharge into a 12-inch pipe running around the ceiling of the pump room, making a loop which carries the discharge to the closed heaters. Each pump can discharge into either side of the loop, thus enabling the other side to be temporarily cut out for repairs if necessary.

There are two vertical coil pipe feed water heaters, each containing 1000 square feet of heating surface, 60 inches in diameter by 12 feet long, designed for 300 pounds working pressure. These heaters are supplied with exhaust steam from the auxiliary Westinghouse engines. The exhaust from the reciprocating pumps at various parts of the basement goes to the open heater. The heaters are situated at the west end of the pump room and are so connected to the pumps and main feed lines that they can readily be by-passed. From the closed heaters the feed water passes through risers to a loop over the first floor boilers, thence to the economizers. From the economizers it passes into another loop above the first floor boilers, whence it is distributed to the individual boilers.

The blow-off piping system includes the blow-off from the boilers and economizers and the drips. These connect to a general waste pipe, which discharges into the flume. The blow-offs on boilers and economizers were in all cases connected up with a keeper valve outside of the regular blow-off valves.

Two Holly gravity return systems are provided for returning the water of condensation in the steam pipes to the boilers. One of them serves the main or superheated steam piping and the other the auxiliary steam piping. The receivers are placed in the engine room basement near the boiler room wall. Connections from the steam piping where water tends to collect are carried to these receivers, from which pipes lead to the discharge chambers located on the wall of the house above the second tier of boilers. From this point the returning pipes drop into a return header located above the drums of the first tier of boilers and connected into them, thus returning the condensation into these boilers.

The general water supply system comprises all the plumbing, all the cooling water jackets and turbine glands, together with hose connections and others for general use. It is supplied by two Epping-Carpenter compound duplex piston pumps, with 6 and 10 inch steam cylinders and 10¼-inch water cylinders and 12 inches stroke. These pumps are constantly operating against a head of 60 pounds pressure and each has a capacity of 500 gallons per minute. The cooling water after being circulated through the bearings is collected and returned to the general supply main by two Epping-Carpenter compound duplex 6 and 10 x 8½ x 12 inch pumps, each having a capacity of 200 gallons per minute. Another auxiliary water supply system is installed for washing and testing the boilers, served by one 8 x 12 x 7½ inch Epping-Carpenter compound duplex outside packed pressure pump, able to supply 250 gallons per minute. While normally used for supplying water for boiler washing, it is so built that full steam pressure can be turned into the low pressure cylinder and the pump then worked under 350 pounds pressure, for testing the boilers after washing and repairs.

For fire protection the entire power station is served by an extensive system, with seven 1⅜-inch monitor nozzles disposed along the parapets surrounding the roof of the building, two at the middle of the coal bridge, commanding the railroad yard, and two on the coal tower itself, commanding the water front. Four Siamese hose connections are provided at the sidewalk level at the four corners of the building and one inside the boiler house at the east end of the coal bunker. This system is served by two 12 x 10 x 12 inch brass lined 1000-gallon Epping-Carpenter pumps, installed in the southeast corner of the engine room basement, with salt water suction direct from the intake flume. These pumps are constantly under steam and are pumping against a head of 100 pounds.

There are three systems distributing lubricating oil. One supplies the turbine bearings and includes a storage tank 8 feet in diameter by 14 feet 8 inches deep, situated in the boiler house at about the level of the coal bunker, from which oil is distributed by gravity to the turbine bearings. From the bearings it is carried to a filter tank, from which it is pumped automatically to the storage tank again by two Epping-Carpenter 6 and 10 x 8½ x 12 inch compound duplex piston pumps, each having a capacity of 200 gallons per minute. The oil pumping and filtering system is located in the northeast corner of the engine room basement. There are about 5000 gallons of oil in this system and about 90 gallons per minute are circulated through each turbine when in operation. About 20 gallons per day is drawn off for various purposes, this including a very small loss by evaporation.

The oiling system for the crank cases of the Westing house engines used for the auxiliaries includes a storage tank 3 feet in diameter by 10 feet 9 inches high, which supplies by gravity a system leading to all Westinghouse reciprocating engines. The discharge from the engine crank cases is pumped to a filter tank and thence flows to a drain tank, from which it is pumped back to the engines, so that crank case oil may be used over as often as desired, this being done by Epping-Carpenter 4½ x 2¾ x 4 inch pumps. Cylinder oil for the lubrication of the cylinders of the reciprocating engines is handled by a system which includes a storage tank feeding by gravity through a system of piping that serves the lubricators on all the reciprocating engines and pumps. Fresh oil is raised into this storage tank from small receiving tanks by compressed air.

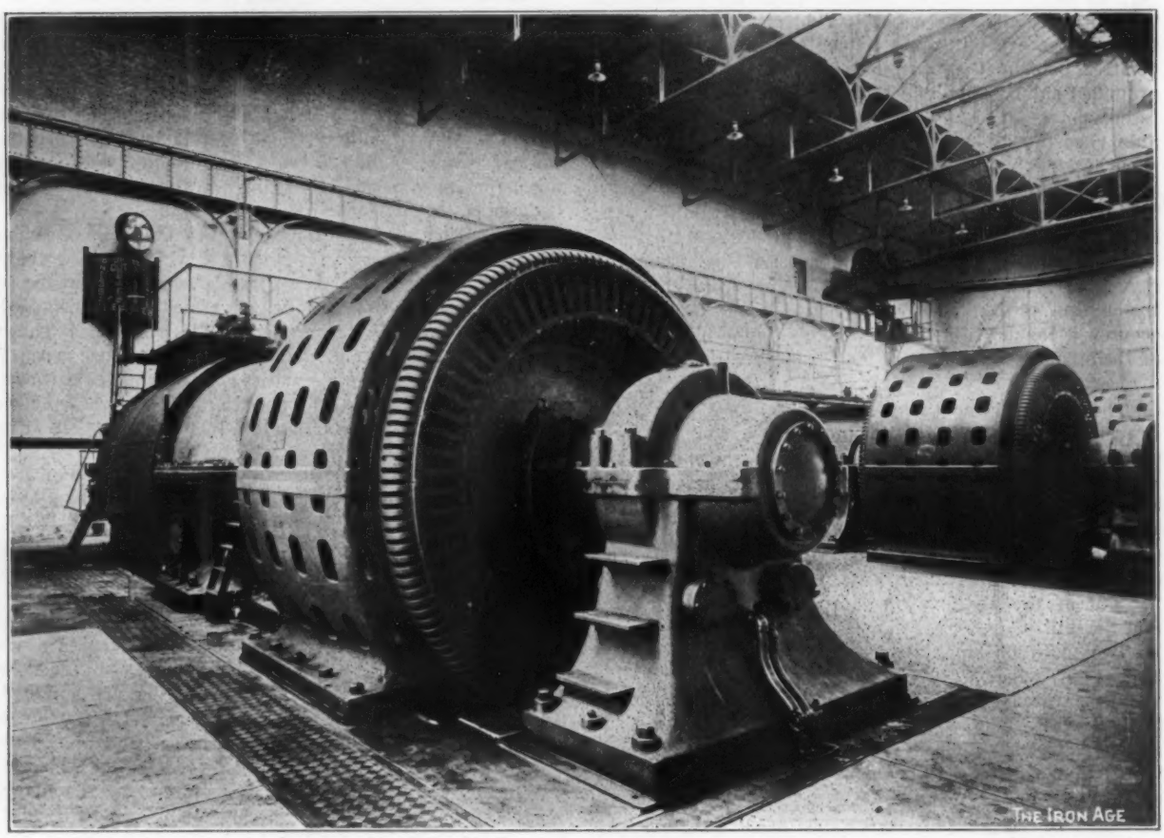


Fig. 6.—The Turbo-Generators as Viewed from the Generator End.

The station is equipped with a compressed air system for cleaning and other purposes. Air is supplied by two Westinghouse motor driven compressors, operating from the 220-volt supply circuit. Each compressor has a capacity of 50 cubic feet of free air per minute, at 100 pounds pressure, and is controlled automatically by a pump governor. The compressed air is used for cleaning the main and auxiliary generators, switchboard apparatus and electrical accessories, and also in connection with the oiling system for forcing new cylinder oil and new crank case oil into the storage tanks, from which these oils are delivered to the oiling system. It is also used for an air hoist for handling oil barrels and emptying them into the receiving tanks. The pressure usually carried on the system is 80 pounds.

The waste from roof leaders and the sanitary appli-

ances runs to a connection to the city system of sewers. The drains and pumps on the basement floor level are so near the level of mean high tide that a tide trap is inserted in the outgoing sewer connection to prevent sewage backing up in the drains. At times of high tide the floor and other drainage is given an outlet to the overflow flume.

Electrical Equipment.

The generators connected with the steam turbines are of the revolving field type. The stationary armatures are enclosed in a large cylindrical yoke of cast iron and are built up of soft sheet steel punchings slotted to receive the winding. The copper wire coils were built into the slots after the armature frames and cores were permanently in position on the bed plates. The machines are "star wound"—that is, the three sets of armature coils needed for the generation of three-phase alternating current are all connected to one point, called the "neutral," and the neutral points of the three machines are connected to one neutral bus, which is permanently grounded through a resistance. The four-pole revolving field is formed of solid steel disks, milled to receive the winding. It is 6 feet 8¼ inches in diameter and about 6 feet long. The core is pressed on and keyed to a 19¾-inch nickel steel shaft running in bearings 15 inches in diameter, through which there is a forced circulation of oil. The field is separately excited at 220 volts, the exciting current being delivered to the winding through a two-ring collector by sliding carbon brushes.

Three separate sources are provided for exciting the main generators; two steam driven exciters, one motor driven exciter and a storage battery. These are designed to give direct current at from 180 to 220 volts. Each steam driven engine units consists of a Westinghouse-Parsons steam turbine coupled to a 200-kw. direct current turbo generator, running at 1800 revolutions per minute. These turbines are of the same general type as the main units and may be operated either condensing or non-condensing with 175 pounds steam pressure and superheat up to 200 degrees. Besides a connection to the superheated steam supply they are also connected to the auxiliary steam main that supplies saturated steam. They can exhaust into one of the large condensers, or into the auxiliary mains, passing the exhaust steam either to the feed water heaters or to a separate outboard exhaust riser. The exciters are located near the southwest corner of the main floor.

The motor driven exciter, also of 200-kw. capacity, is driven by a 290 horse-power, three phase 440-volt induction mtor, both motor and generator being mounted on the same shaft. This exciter is located in the operating gallery. The motor takes current from three 175-kw. transformers in the basement of the electrical gallery. The storage battery is intended mainly as an absolutely reliable source of supply of the exciter bus system and the other more important auxiliaries. It is installed in a specially arranged room in the engine room basement and consists of 110 cells, each containing seven plates of the type "R" chloride accumulator manufactured by the Electric Storage Battery Company. This battery has a discharge rate of 366 amperes for one hour and is controlled from the operating gallery. It is normally kept floating across the excitation bus. To charge the battery a 12½-kw. booster driven by a 15 horse-power induction motor is located in the operating gallery next to the motor driven exciter.

Switchboard Apparatus.

The generators are designed to run in parallel on either of two sets of main bus bars, called the "working" and the "auxiliary" bus, only one set of which is generally in use. The switches for the outgoing feeders are arranged in groups of six. To distribute current it is necessary to connect a group bus to either the working or the auxiliary bus, and this is done by providing each group with two selector circuit breakers, one for each of the two sets of main bus bars. Thus any generator or any group of feeders can be connected at will to either set of main bus bars.

All of the switches and regulating or auxiliary appliances are controlled from the operating room at the east end of the third or operating gallery. When the plant is ultimately extended this will be in about the center of the building. The gallery is about 13 feet above the engine room floor and projecting from it is an overhead observation balcony which gives a good view of the whole engine room.

Lighting and Heating.

The lighting of the station is done by arc lamps for general illumination and incandescent lamps for detail illumination. There are 72 Westinghouse 110-volt direct current enclosed arc lamps installed, and about 1220 16 candle power, 220-volt incandescent lamps, supplemented by about 150 special receptacles for the use of extension plug connections to facilitate inspection and repair of machinery.

The heating of the electrical galleries and offices is accomplished by a direct system of low pressure steam pipe coils amounting altogether to about 3300 square feet of radiating surface. It is supplied by live steam, working through a reducing valve.

Hoisting Machinery.

The traveling crane spanning the engine room has a capacity of 55 tons and a span of 64 feet. It is of the double trolley type with a hoisting and a trolley motor on each trolley, besides the main motor, which propels the entire crane. The hoisting trolleys are geared for both slow and rapid hoisting. The crane is operated from the 220-volt circuit, and was built by the Morgan Engineering Company.

There are two elevators, one a passenger elevator for serving the offices and electrical galleries, and the other a combination freight and passenger elevator in the boiler house, running from the basement to the top of the coal bin. These elevators were made by the Marine Engine & Machine Company and are all of the electrically controlled type operated from the 220-volt circuit. They are driven by motors capable of handling a live load of 1800 pounds at 200 feet per minute, and are fully equipped with safety devices. The elevator in the boiler house is arranged for automatic button control.

Machine Shop.

A machine tool equipment is provided to facilitate light repairs in a shop located on the top floor directly over the electrical operating gallery. The equipment comprises a portable Buffalo forge and anvil; a pipe threading machine capable of handling up to 12-inch pipe; a bolt cutting machine with bolt and pipe dies up to 2 inches; a 16-inch swing engine lathe and a 30-inch swing with a 16-foot bed; a 30 x 30 inch x 8 foot planer; a 20-inch shaper; a 48-inch radial drill; a light speed lathe; a sensitive drill; a wet and dry grinder; an ordinary grindstone, and a hack saw. This machinery is arranged in two groups driven by a line shaft, which extends over both groups, but is subdivided at its center by a clutch coupling. Two 15 horse-power Westinghouse induction motors are coupled to the shaft, one at each end, so that part of the machinery may be driven without running all of the shafting.

A swinging jib crane with a 2-ton Sprague electric hoist enables heavy pieces to be lifted into the machine shop from the engine room floor.

Conclusion.

With regard to dates, the following are interesting: The first work of clearing the site began on September 15, 1903, and the excavation on October 20. The first turbine was started January 16, 1905. High tension current was first turned into the transmission lines April 27, 1905. Current was furnished for testing cars on May 13, and on July 26, 1905, the line between the Flatbush terminal and Rockaway Park, the first section of the Long Island Railroad to use the new motive power, was permanently changed from steam to electrical operation.

The station was planned and built by Westinghouse, Church, Kerr & Co., for the Pennsylvania, New York & Long Island Railroad Company, which is the organization through which the Pennsylvania Railroad is carrying on its New York extension work. The design and construction were under the charge of George Gibbs, chief engineer of electric traction of the road, and under the general supervision of the Mechanical & Electrical Advisory Committee—New York Extension, a committee composed of officers of the Pennsylvania Railroad Company.

The Mossberg Pull Countershafts.

Pull handle countershafts have a wide range of application in machinery that requires frequent starting and stopping. This is particularly true in light machinery, such as grinders, sensitive drills, swaging machines and wire straighteners. The two styles shown in the illustrations are similar in general principle, but differ in details of mechanism. Both are made by the Mossberg Wrench Company, Central Falls, R. I.

The countershaft shown in Figs. 1 and 2 is known as the Sim-Pull, and is made in two forms, No. 2 differing from the one shown in having separate independent hangers, with the pulleys supported between them. The belt shifting device is positive and the extent of the pull is short. Referring to Fig. 2, it will be seen that a pull on the handle causes the pendulum A on the slide G to engage the cam B, deflecting the shipper slide C to the left, as indicated by the dotted lines. At the end of the movement of the shipper slide the cam B is shifted slightly, so that at the next pull of the handle the pendulum will be swung in the opposite direction, and the shipper slide deflected in a direction reverse to its preceding movement. Thus the belt that has been shifted from the loose pulley to the tight pulley by the first pull is returned to the loose pulley by the second pull. Between pulls, when the handle is released, the shipper slide is locked in position by wards D and E, one or the other of which is engaged by the projection F on the pendulum slide.

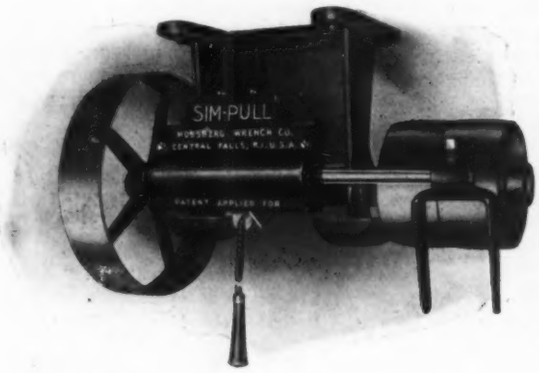


Fig. 1.—The Sim-Pull Self Contained Countershaft.

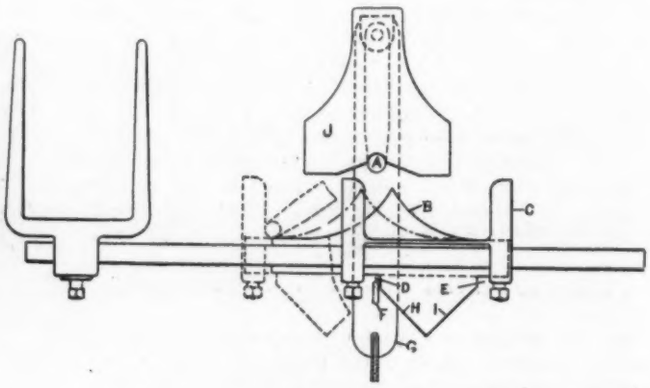


Fig. 2.—Diagram of the Action of the Sim-Pull Belt Shifter.

The pull handle is attached by a cord to the bottom of the pendulum slide G, which is normally held in its upper position by a helical tension spring. A failure to pull the handle clear down does no harm, as on the return of the slide, after the handle is released, the projection F engages with either the incline H or I and wedges the shipper slide to one extreme of its travel, so that the belt shipper is positively moved to one of its positions and cannot stop half way. At each return the pendulum A is guided to and located in proper starting position by the form of the bottom edge of the cover plate J. The Sim-Pull countershaft is made in six sizes, three with single hanger, ranging from a driving pulley 8 x 1¾ inches to 12 x 2¾ inches, and three sizes with two hangers, from 14 x 3¼ inches to 18 x 4¼ inches.

The second of the countershafts, shown in Figs. 3 and 4, is called the Multi-Pull. In the form illustrated it is simply a belt shifter, and may be used in connection with any countershaft. It was an extension of the principle of the Sim-Pull, and derived its name from the fact that although made in only one size it is possible by the interchange of one part to make its range of action anything from 1¾ to 4¼ inches. This part is a gear crank O, shown in Fig. 4, which is mounted on the shipper slide C, with its teeth engaging a rack P. The crank pin R engages the cross head F, with a shoe T. The movement of the shipper slide is constant, being due to the action of the pendulum and the cam, as in the Sim-Pull countershaft. In its movement the shipper slide rolls the gear crank O on its rack, rotating it through half a turn. The gear crank carries with it the cross head F, imparting the same lateral movement as that of the crank pin R. Thus the actual movement of the shipper slide may be shortened or lengthened, as compared with the normal throw resulting from the action of the pendulum and cam, this being regulated by the throw of the gear crank. For example, if O is a plain gear, having a central pin actuating the cross slide, the latter would be carried the

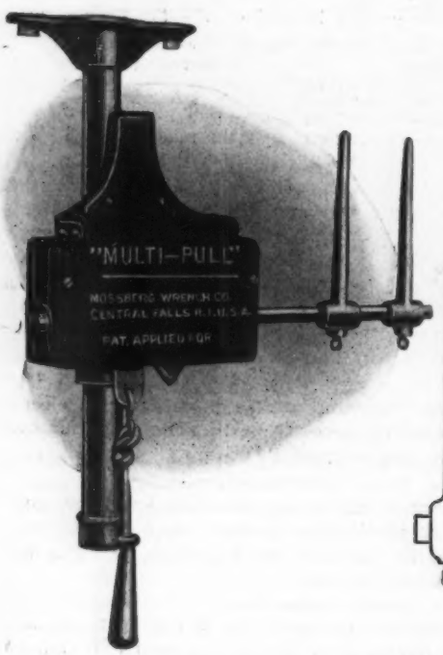


Fig. 3.—The Multi Pull Belt Shifter.

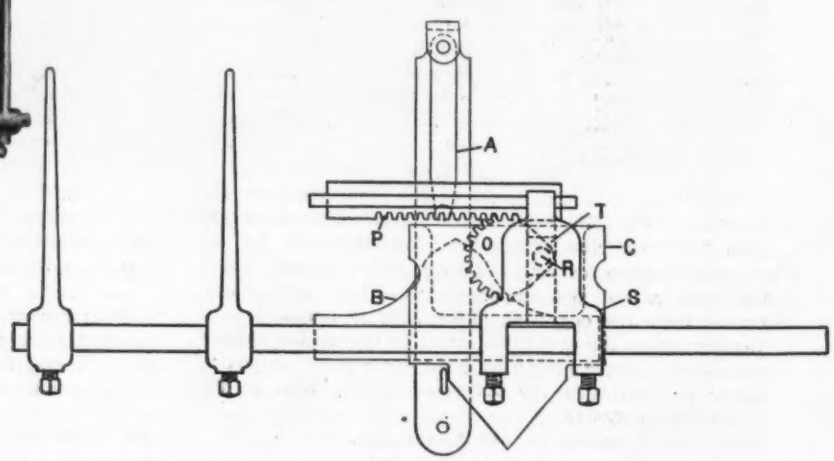


Fig. 4.—Diagram of the Action of the Multi-Pull Shifter.

same distance as the shipper slide, or 2¾ inches. If the crank pin were in position to give a 1½-inch throw to the crank it would impart to the cross head 1½ inches more lateral movement than the shipper slide has. The gear O, shown in Fig. 4, has the maximum throw, 1½ inches, and is applicable to only one width of belt, 4¼ inches. Intermediate sizes, having ½ and 1 inch throws, may be mounted in either of two positions, so that the throw of the crank has a plus or a minus effect in transmitting the movement of the shipper slide. In this way the ½-inch crank is used for either a 3¼ inch or a 2¼ inch belt, and the 1-inch crank for a 3¾ inch or a 1¾ inch belt. The gear having a crank pin at its center is applicable to a 2¾-inch belt only.

Careful attention has been paid to lubricating the self contained hanger. Oil is contained in a reservoir holding half a pint, and is conveyed by a wide flat wick to the shaft. After passing along the bearings to hoods at the ends of the hanger, it returns to the reservoir through channels provided for the purpose. Centrifugal devices in the hoods deflect the oil so that it cannot creep along the shaft beyond the bearings.

The Ratio of Copper and Pig Iron Consumption.

Dr. James Douglas of Phelps, Dodge & Co., New York, has contributed an article to the *Engineering and Mining Journal* in which he compares the quantity of pig iron and of copper used in the arts for a series of ten years. In the accompanying table the column of production of iron represents also its consumption, inasmuch as the imports of iron and steel are nearly balanced by our exports. The home consumption of copper is calculated on the production, plus importation, minus exports. As larger or smaller quantities are carried in stock from year to year, the following years are bracketed—namely, 1897 and 1898, 1899 and 1900, 1904 and 1905. The couples then correspond closely with the average, and with the consumption of other years.

Comparative Statement of the Production of Iron and Copper in the United States.—1896-1905.

Year.	Pig iron produced and consumed. Gross tons.	Per cent. of increase.	Copper produced. Gross tons.	Per cent. of increase.	Per cent. of copper to iron.	Tons pig iron produced to 1 ton copper.	Copper consumed in the United States. Gross tons.	Tons of pig iron consumed to 1 ton copper.
1896.....	8,623,127	....	208,760	...	2.42	41	102,083	83
1897.....	9,652,680	11.94	223,825	7.22	2.32	43	122,501	87 {78
1898.....	11,773,934	21.97	239,241	6.89	2.03	49	122,382	{96
1899.....	13,620,703	15.68	259,517	8.47	1.91	52	174,822	83 {78
1900.....	13,789,242	1.24	268,229	3.36	1.95	51	155,169	{88
1901.....	15,878,354	15.15	271,949	1.39	1.71	58	196,836	81
1902.....	17,821,307	12.23	288,342	6.03	1.62	62	213,300	84
1903.....	18,009,251	1.05	319,043	10.65	1.77	56	224,026	80
1904.....	16,497,033	*8.50	372,233	16.35	2.25	44	215,264	83 {77
1905.....	23,010,625	39.48	413,066	10.95	1.79	56	262,678	{88
Totals....148,676,256		12.25	2,864,205	7.92	1.93	52	1,789,061	83

* Decrease.

Commenting on this table, Dr. Douglas says:

"The production of copper shows much slighter variations than that of iron, due to the fact that the copper miners, being unprotected by either tariff or trusts, have no inducement to restrict their output to the demands of a home market, but have for many years opened and sustained commercial relations with the world at large.

"What is particularly interesting is the ratio of home consumption of copper to that of iron. During the ten years illustrated in the table the consumption of copper has been 1 ton of copper to 83 tons of iron, and so uniform is the proportionate use of the rarer to the baser metal that, assuming the bracketed years merely to correct variations due to shifting stocks or temporary disturbances, the ratio of consumption of copper to iron has never fallen below 1 to 80 nor risen above 1 to 87. But during 1905 the percentage in increase of pig iron over 1904 was 39.48 per cent., though the average for ten years was only 12.25 per cent., while the increase of copper production in 1905 over 1904 was only 10.95 per cent., or only 3 per cent. above the average.

"If, therefore, there has been a demand for copper in the ratio of 1 to 83 of iron, to meet the requirements of the trade, the stocks of copper must be very low, and we need not attribute to artificial manipulation the existing scarcity. The development of our iron mines and the capacity of our iron and steel works are such that a large increase in production of raw ore and finished product can apparently be made without seriously affecting the price, but no large increase in demand can be made on either our own or the world's copper resources without producing scarcity and a high value for the metal."

Niagara Conditions from the Canadian Viewpoint.

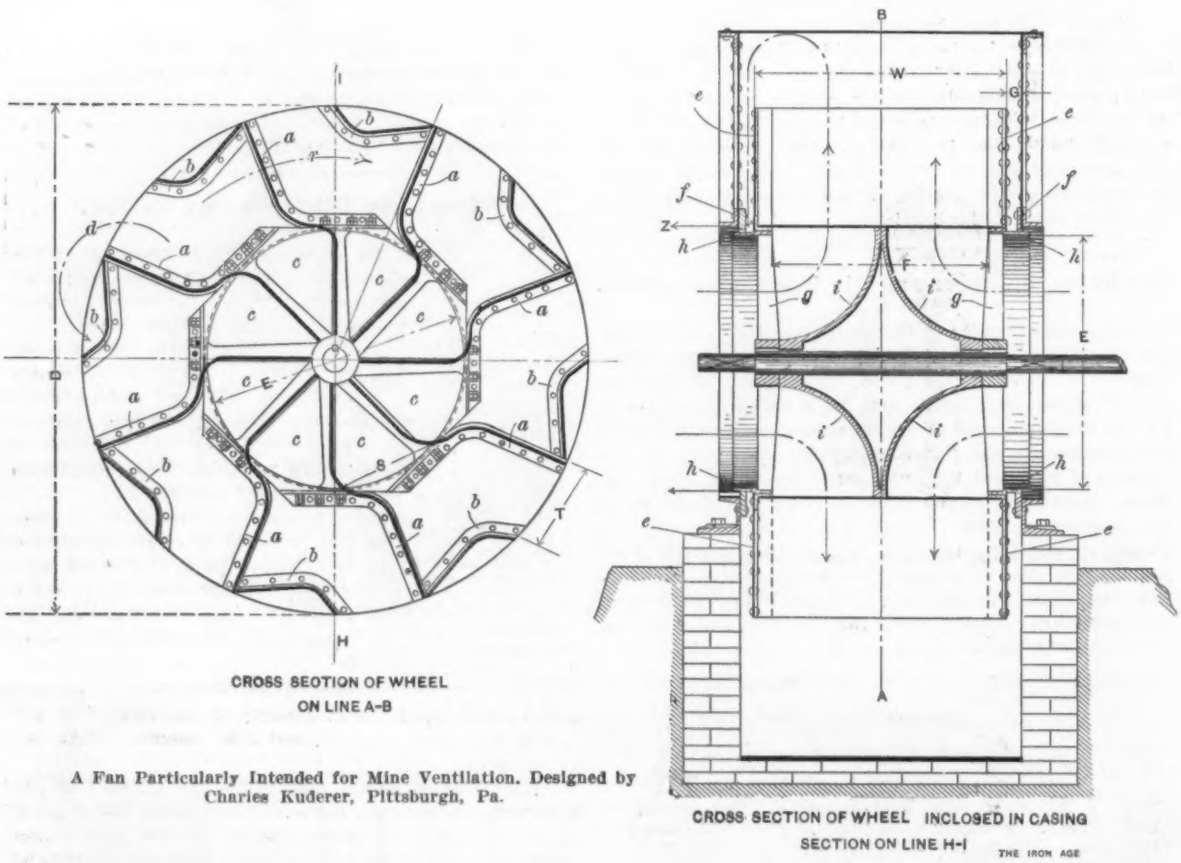
NIAGARA FALLS, N. Y., April 9, 1906.—The report of the Canadian section of the International Waterways Commission claims that to the 415,000 horse-power to be developed by the works of the three companies now in progress on the Canadian side, from 200,000 to 400,000 additional horse-power can be harnessed without in any way impairing the scenic beauty of the falls of Niagara. It is recommended that until the consequences of the works actually under construction are known no arrangement whatever be made with the United States Government. It is contended that if the falls are impaired in beauty to-day the mischief is done on the American side, as the power companies on the New York side have their intakes above the rapids at which the falls commence. On the other hand, not one of the three Canadian companies has an intake above the rapids. One—the Ontario Power Company—takes water at the crest and the other two below the crest. It is further recommended that inasmuch as the demand for power from the Canadian companies will be limited for some time, it would be good policy not to permit any other companies holding Canadian charters which have not yet commenced operations to proceed with their work, but that their charters be canceled and none others be granted until the actual condition of affairs as shown by the completed works of the present companies is known.

The report further states, in the opinion of the commissioners, that it is not advisable to make any treaty with the United States in reference to Niagara alone, but that any international arrangement must embrace all of the waters adjacent to both countries, from the Atlantic to the Pacific, and that the duration of the treaty shall not exceed 25 or 30 years.

Sir James Kitson, speaking in the House of Commons recently on the resolution declaring against the introduction of any system of protection in Great Britain, replied to Mr. Chamberlain's assertion that "iron is going." Sir James Kitson said that the output of pig iron in Great Britain in 1905, which was 9,500,000 tons, was an increase of 1,000,000 tons over the production of 1904, and it was estimated that this year the production would be 10,000,000 tons. He said that the iron trade was advancing with rapid strides and cited the financial results of a number of companies as indications of prosperity. The trade in Sheffield, he said, was so good that it had been decided not to ask for a share of the Queen's Unemployed Fund, the number of unemployed in Sheffield being below the normal average.

The Kuderer Mine Ventilator.

The centrifugal fans used for ventilating mines are usually noteworthy for their size, many of them discharging as high as from 100,000 to 500,000 cubic feet of air per minute, against a resistance varying from 3 to 8 inches of water. They are of massive design and are subject to very heavy and continuous service. The illustration shows one designed by Charles Kuderer of Pittsburgh, Pa., which is rather unique in design and construction. The left hand view shows a section of the wheel or impeller, and the right hand view a section at right angles, or parallel with the shaft, through the fan wheel and housing.



A Fan Particularly Intended for Mine Ventilation. Designed by Charles Kuderer, Pittsburgh, Pa.

The impelling blades are shown at *a*, and extend outward radially from the shaft to the circumference of the throat circle, then bend backward with reference to the direction of rotation, indicated by the arrow *r*, and continue again radially to the periphery of the wheel. The air is acted upon from the moment it enters the wheel inlet until it is finally discharged from the blade tip at maximum pressure. The rearwardly curved blades *b* serve two purposes; to contract the area of the discharge outlet at the circumference of the wheel to give the air a high final velocity, and to prevent the air from re-entering from one chamber of the wheel rearward, as shown by the arrow *d*, into the next chamber. This action of re-entering would cause a churning of air, which in some ventilator designs is overcome by making the wheel conical. It is the inventor's opinion that conical wheels are detrimental to the working efficiency because they disturb the air too much in its passage through the wheel.

The wheel is supported by two octagonal spiders *g*, one at each inlet, or on either side of the wheel. The wheel preferably has two inlets to allow the air to enter at a low velocity, and to prevent eddying, deflectors *i* change the direction of the air easily. The angle irons carrying the blades are bolted to the octagonal faces of the spiders, as shown in the section at the left of the engraving. If efficiency and economy in operation are to be obtained, leakage should be carefully avoided in ventilator designs. To prevent leakage in the Kuderer fan, packing rings *f* are provided, as shown in the right hand section. These rings are made an easy running fit over the revolving flanges *h* and are held stationary by being bolted to the housing of the ventilator. The wheel is shrouded by plates, *e*, to compel all air entering the wheel to pass through it before expansion takes place; consequently it is discharged at maximum pressure at the tip of the blade.

The accompanying table gives results of tests on a fan of this type. It is interesting to note that the inventor claims to have found no perceptible difference in the temperature of the air at the inlet and the discharge. All of the tests were made in the month of August, and the ventilators in all cases were discharging directly into the atmosphere. The size of the ventilator was 6 feet in diameter and 3 feet wide.

Tests of a Kuderer 6-Foot Mine Ventilating Fan.

Revolutions per min.	100	200	300	350	400
Water gauge, inches.	0.2	0.6	1.3	1.6	2.8
Air temp., degrees..	80	81	82	84	83
Volume of air delivered, cubic feet per minute	8,290	19,813	35,872	43,557	39,000
Clear inlet area, square feet.....	13.5	13.5	13.5	13.5	13.5
Clear outlet area, square feet.....	3.97	4.56	6.09	6.09	4.56
Discharge velocity of air, feet per min.	2,115	4,345	5,900	7.164	8,639
Intake velocity of air, feet per min.	746	1,768	2,700	3,137	2,975
Barometer, inches..	29.25	29.25	29.25	29.25	29.25
Horse-power in air.	0.26	1.9	7.3	10.9	17
Delivered air pressure, pounds per square foot.....	1.04	3.12	6.76	8.33	14.56

The amount of clearance allowed between the wheel and casing is arbitrary and should be just sufficient to allow the wheel to revolve freely in the casing, but when the packing rings are used the distance may be from 2 to 12 inches without detriment to the working efficiency of the apparatus. The proportions of the wheel are about as follows: On the engraving the circle marked E represents the inlet diameter, which is made equal to one-half of the diameter of the wheel D. The width of the wheel W is also equal to one-half of the diameter of

the wheel. F is the distance between the inner edges of the spider arms. The throat area is equivalent to 3.1416 multiplied by E, multiplied by F, and is made equal to the combined inlet area multiplied by 2. The product of S, which represents the distance between blades at the throat circle, multiplied by the distance between the inner faces of the spider, F, is equal to the width of the wheel W multiplied by T, the circumferential length of the discharge opening.

The Brown Recording Revolution Indicator.

The recording revolution indicator made by Edward Brown & Son, Philadelphia, Pa., manufacturers of pyrometers and scientific instruments, is particularly adapted for use on slow running engines, such as Bessemer and blast furnace blowing engines, but it can also be used for high speed engines. The complete instrument is

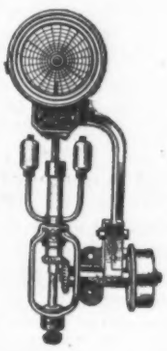


Fig. 1.—The Brown Recording Revolution Indicator.

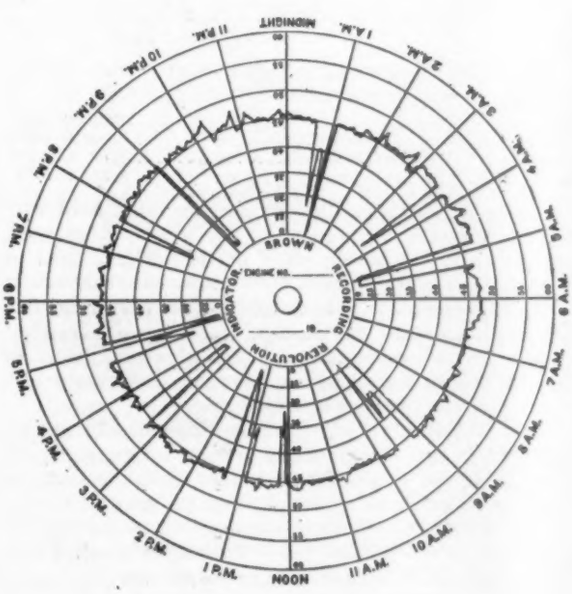


Fig. 2.—A Sample Chart Reduced One-Half.

shown in Fig. 1, and Fig. 2 is a reproduction of a chart taken from one of these instruments in use on a blast furnace blowing engine.

The pen which makes the record is connected with a float resting on a vertical column of mercury in a cylinder connected at the bottom to upright tubular arms surmounted by reservoirs. When the apparatus is revolved the centrifugal force draws the mercury into the revolving arms and allows the float to descend by an amount which is proportional to the speed. This, in brief, is the action of the device, and its simple mechanism will be readily understood from the engraving, Fig. 1.

The instrument has a usefulness which goes rather beyond the usual forms of revolution indicators and revolution counters, inasmuch as it not only gives a constant indication of the speed, but records its value at any and every moment. It serves the function of a revolution indicator, so that the engineer may keep the engine at required speed, and saves the calculation necessary to reduce the readings of a revolution counter to the number of revolutions per minute. The result is also more accurate, as by calculation the average speed is all that is deduced, and no allowance is made for the time in which the engine is slowed down or stopped, unless frequent readings are recorded. For example, the engine may run at 45 revolutions per minute for a certain period of time, and at 40 revolutions per minute afterward for an equal period of time, and the revolution counter, after calculation, would show 42½ revolutions per minute as the speed for the whole time. In modern blast furnace practice, and in many other operations, it is desirable that the engines be run at a given speed and kept at that speed. The recording revolution indicator is a check on whether this detail is attended to or not, and is a valuable accessory on that account alone.

A Duquesne Blast Furnace Record.

During March the Duquesne blast furnaces of the Carnegie Steel Company surpassed by 978 tons the record of production made by the Edgar Thomson furnaces D, E, J and K of the same company in March, 1905. The four Duquesne furnaces made last month 78,120 gross tons of pig iron, against 77,142 tons made by the Edgar Thomson furnaces. This new record gives a daily average for the four furnaces for the month of 2520 tons per day, or 630 tons per day per furnace. The best run of 24 hours was made March 30, when No. 1 made 832 tons and the group of four stacks 2882 tons.

The working of No. 1 furnace was the best. In spite of the fact that a broken dumping lever necessitated a shutdown of 15 hours the furnace made the largest output of the group, and during the last seven days of the month produced 5313 tons, an average of 760 tons per day. The working of the furnace was regular and steady and its practice excellent. With an almost constant pressure of 15 pounds it took 58,000 cubic feet of air per minute, and on this high amount of air made only 437 tons of flue dust. It consumed 1896 pounds of coke per ton of iron.

The record of 78,120 tons is the net product of the four furnaces, but with the addition of 2473 tons of ladle and other scrap the gross product for the month was 80,593 tons. The figures given below show the tonnage of raw materials used during the month:

	Tons.
Total metallic mixture	145,533
Coke used	70,625
Limestone	32,992
Total	249,150

The consumption of coke per ton of iron was 2025 pounds. A. N. Diehl is superintendent of these furnaces.

The Pennsylvania Railroad's Ore Dock at Buffalo.—The Pennsylvania Railroad Company announces the completion and full equipment of its new ore docks at Buffalo, to which access is given by a canal 2200 feet long and 200 feet wide. Two Brown electric fast plants and one Hulett electric stiff leg unloader have been installed, so that ore can be unloaded directly into cars or dumped back into a large storage bin with capacity of 250,000 to 300,000 tons. The Brown plants are guaranteed to unload to cars or stack piles 75 per cent. of the capacity of modern boats with hatches 24 feet center to center, without hand labor, at the average rate of 150 tons per hour each. The Hulett unloader is guaranteed to unload 200 tons per hour for an entire cargo from vessels of 5000 tons capacity or over, minimum size of hatches 10 feet 6 inches long by 7 feet 9 inches. The self grabbing bucket has a capacity of 10 tons. The machines installed on this dock have a hoisting capacity of over 1,000,000 tons of ore in the season. The Pennsylvania Railroad Company also refers to the new Myler hoists with clamshell buckets of 1½ tons capacity, which have been installed on its docks at Erie, Pa. At these docks 1,200,000 tons of ore can be unloaded from vessels in the season of navigation.

Galvanized Wire Fencing for Railroads.*

Fence wire is galvanized to protect it from oxidation, and galvanizing consists in coating the wire with a thin layer of zinc applied by passing the cleansed wire through a zinc bath, whose temperature is about 800 degrees F. The zinc coating on the older barb wire fences, galvanized after the barbs were woven in, has withstood oxidation successfully for 18 or 20 years, and there are many examples of galvanized telegraph wire that have been in service for over 30 years and which to-day retain the zinc coating so that the wires are practically as good as new. All of the smooth galvanized wire woven fences that have been in service for more than five years have lost considerable of their galvanizing and the exposed iron or steel is rusting. These rusted places are found on top, bottom, intermediate wires and stays in such locations as to indicate that their cause is variable thickness, quality or workmanship in the galvanizing rather than the variation in exposure.

As zinc is acted upon by sulphurous acid and sulphuric acid more readily than upon steel or iron we cannot expect galvanized wire to last longer than bare iron or steel would do when exposed continually to the fumes of switching engines or when located near smelters or other manufacturing plants where much smoke is emitted. The thickness of the zinc coating on wire supplied today for the manufacture of woven wire fence is such as will usually stand only two one-minute immersions in a saturated solution of blue vitriol. It is fair to assume that fence wire galvanizing is only about half as thick as telegraph wire galvanizing, since the latter will stand four one-minute immersions in the blue vitriol bath.

Double Galvanizing of Longitudinal Wires.

The reason the manufacturers make the fence wire galvanizing so thin is to prevent the scaling of the zinc when the wire is being twisted, knotted and wrapped by the fence weaving machines. The thick layer of zinc is not sufficiently elastic to withstand the work of the machines without scaling, while the very thin coating has appeared to withstand this work better and has therefore been adopted, with the very unsatisfactory results above mentioned. Your committee had several samples of fence woven of all No. 9 double galvanized wire on which the zinc coating was of sufficient thickness to withstand the four one-minute immersion tests. Upon examining this fence it was noticed that the zinc on the longitudinal wires did not suffer from the action of the weaving machines; the zinc on the stay wires, however, where they were wrapped around the longitudinal wires, scaled as dry, thick paint would do. It would appear therefore that the best galvanizing protection which we can secure under present methods of fence manufacture is that the longitudinal wires be double galvanized—that is, that they receive a coating that will stand the four one-minute immersions in the blue vitriol bath.

The thickness of the zinc covering for stay wires and fastenings must be regulated to suit the machines on which the various kinds of woven fence are manufactured, to insure against its scaling. This condition applies, we believe, to all machine made fence. There are, however, several types of field erected fence in which the longitudinal wires, vertical wires and fastenings can be made successfully of double galvanized wire, the cost of which is as much higher as the difference between weaving the fence by machine or having it woven in the field by hand.

One maker in his desire to increase the life of his fence coats it by dipping it in white zinc paint and claims that it "will protect the life of the wire the length of time this coating stays on." The above is only a partial remedy, and if we desire to continue the use of machine woven fence and secure proper results in the matter of galvanizing it appears that a better method would be to use the present thinly galvanized wire to manufacture the fence, and after it is made cleanse it and give another coating of zinc, the same as is done in the case of some kinds of poultry netting.

To galvanize fence after being manufactured was suggested to several fencemakers. The flexible joint fencemakers objected to this method, on account of the soldering effect the zinc would have on the joints. Another maker advises that he has been experimenting in this direction, but as yet has not made it a commercial success, the difficulty being in his inability to apply the zinc evenly and thoroughly, together with its excessive cost. One stiff stay and rigid joint manufacturer, however, offers to install the necessary plant to galvanize the fence after it is made, provided sufficient business is insured to warrant the investment.

The Manganese Theory Not Disposed Of.

The committee is unable to confirm or disprove the theory of Dr. A. S. Cushman, of the Department of Agriculture, that the manganese content, especially if unevenly distributed, is in part the cause of the trouble, and for the present prefers to recommend good galvanizing as the remedy. The committtee concludes, first, that the rapid deterioration of modern woven galvanized fence wire is caused by the coating of zinc being too thin and of an uneven thickness; second, that to procure better protection to the wire and a longer lived fence it is necessary to secure an increased uniform thickness of the zinc coating on the wire, and to insure that the galvanizing is intact after the wire has gone through the fence weaving machines it would seem to require that a second coat of zinc be applied to the fence after it is manufactured.

A large fence wire manufacturing company suggests that the ultimate tensile strength for the three grades be not less than the following:

	Hard. Pounds.	Medium. Pounds.	Soft. Pounds.
No. 7	3,118	2,530	2,136
No. 9	2,200	1,800	1,507
No. 11	1,475	1,295	1,010
No. 12	1,182	810	795
No. 13	921	756	650

They also state that the ranges in chemical composition are about as follows:

Carbon	0.08 to 0.30
Sulphur	0.035 to 0.070
Phosphorus	0.02 to 0.065
Manganese	0.30 to 0.70

The best results can be obtained by using hard wire for longitudinals, on account of the increased strength, together with the spring effect of the cooling. Soft or medium wire must be used for verticals in those fences where the vertical wire is wrapped around the longitudinal ones, as well as for knots or fastenings at the intersections of the longitudinal and vertical wires. Different types of fence for the best results require different grades of wire for the verticals and fastenings.

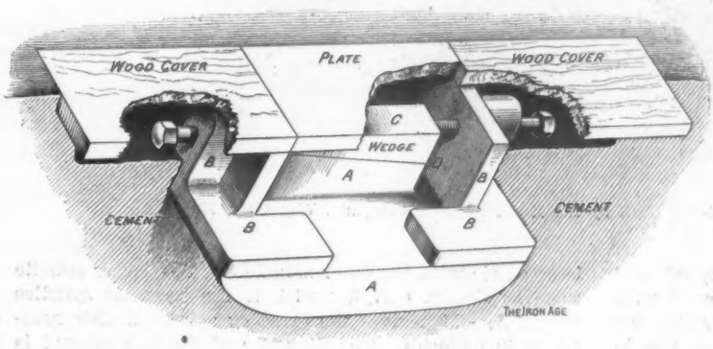
The committee recommends in respect to physical requirements that hard wire, whose ultimate tensile strength for No. 9 gauge is from 1800 to 2200 pounds, be used for longitudinal wires and that the vertical fastenings be as near the above in ultimate tensile strength as the action of the various fence weaving or erecting machines will admit without injuring the wire.

* Extracts from the report on Standard Right of Way Fence, presented at the annual meeting of the American Railway Engineering and Maintenance of Way Association, Chicago, March 20-22, 1906.

The American Cast Iron Pipe Company, Birmingham, Ala., expects to begin to manufacture pipe in its new works about May 1. It will make pipe from 4 to 36 inches in diameter. The works are located on a tract of 53 acres of land in North Birmingham, Ala., on which the company has erected five buildings. The main building, containing the foundry, is 99 x 351 feet, and is constructed of steel. The other buildings comprise machine and pattern shops, power house and cleaning sheds. Tracks have been laid connecting the works with all the railroads entering the city. The company was organized and incorporated under the laws of Georgia on October 12, 1905, with an authorized capital stock of $150,000, but carrying the privilege to extend to $1,000,000, for the manufacture of cast iron pipe and special castings. J. J. Eagan is president, E. L. Douglas and W. W. Orr are vice-presidents, C. Blair is secretary, J. W. Blair treasurer and E. E. Linthicum general manager.

Consular Service Improvement.

A group of New York business men interested in foreign trade is distributing a copy of a special memorandum on improvement of the consular service, entitled "Americans Needed as Vice and Deputy Consuls," which has been prepared, in response to requests, by John Barrett, United States Minister to Colombia. Some surprising statements are made in this memorandum. It appears that of 343 consular offices of greater or less importance 176, or half, are officered with vice or deputy consuls who are not American citizens, native born or naturalized. These figures do not include semiconsulates or quasi commercial agencies, classed simply as agencies, to the number of 400, having men who are not Americans in charge of 275 of these. It is asserted that by the present faulty system a gratuitous leak is provided by our Government for the advantage of those it desires to distance in the race for trade. Even though a foreign official may be entirely honest and keep the information he receives as confidential (which unfortunately has not been the case at many posts) the arrangement is unsatisfactory. It is suggested that a law requiring vice and deputy consuls to be Americans and to receive proper salaries would not only remove a serious handicap of the present system but provide an excellent school of consular training and experience for a considerable number of bright young men who would be, with the proposed remodeling of our consular service, in line for promotion to consulships, in which they could serve with special ability and success. The State Department is in no way responsible for the weakness of the present system and would undoubtedly be glad to improve it, but general interest in the question has never been sufficiently aroused to secure favorable action by Congress.



An Adjustable Plate Used by the Norton Grinding Company for Accurately Leveling a Planer.

Piping in Steel Ingots.—In the issue of March 1, 1906, we reprinted a paper by N. Lilienberg, Philadelphia, which was read at the Bethlehem meeting of the American Institute of Mining Engineers in February, in which was described the Illingworth casting machine for compressing large sized ingots. In that paper the statement was made that with the Illingworth press "three or four men can cast and compress six ingots 13 inches square and 40 inches long in an hour's time." We are advised by Mr. Lilienberg that this statement should be corrected, as follows: "If sufficient presses are installed three or four men can cast and compress 60 ingots in an hour."

That the cast iron car wheel can be made stronger and more durable by making it more elastic is a theory that is gaining ground. The present form of double plate wheel is extremely rigid, and contains metal where it is least needed. By reducing the rigidity of the portion between the rim and the hub the wheel will be made more flexible and better able to withstand shocks. In this way the flange, which is now the weakest part and which cannot be enlarged because of the limitations imposed by frogs and crossings, will be relatively strengthened.

A Planer Leveling Device.

An important part in the manufacture of the big cylindrical grinding machines built by the Norton Grinding Company, Worcester, Mass., is the accurate finishing of certain surfaces on the large castings entering into them. These must be very exact and are carefully scraped to accept the test of long Brown & Sharpe straight edges. Scraping is a slow and expensive operation and consequently it contributes to economy if the amount of scraping necessary is reduced to a minimum by obtaining all possible perfection in the planing. The company is installing a new Pond planer and to level it very accurately on its foundations has devised an interesting contrivance of the form shown in the illustration.

The planer will rest on a solid bed of concrete 4 feet thick extending down to hard pan gravel. In the bed were left 14 recesses, one under each of the feet of the planer, to receive the leveling devices. Where the highest refinements are attempted and thousandths of an inch are considered the apparently stiff table of a planer is relatively flexible, and a perfectly true cut can only be obtained if the table is uniformly supported in absolutely level ways. These leveling devices make it possible to secure and maintain such a support. In setting each one, the casting A was carefully propped in position so that the upper surface of the plate, resting on the wedge C, was in an exact horizontal plane, and then cement was poured in to permanently fix the position of the casting. Upon this casting rest the two castings B and B, carrying the two adjusting screws. These after being placed in position were covered with cement to the floor level, spaces D and D being left on each side of the wedge to allow it a certain amount of movement between the parts B, and under the wooden covering plates to give access to the heads of the adjusting screws. Loosening one screw and tightening the other shift the wedge and raise or lower the wedge plate, while always maintaining it in horizontal position. Adjustment to thousandths of an inch is possible, as a considerable movement of the wedge is required for a relatively small vertical movement of the plate, or, to be exact, the plate moves ⅛ inch to a 4-inch movement of the wedge.

After all the plates were in position they were adjusted to the same level accurately by the use of a 15-foot straight edge. First, three of the plates were adjusted until tissue paper moved alike between straight edge and plate. Then the straight edge was moved along, covering two of the adjusted plates and one other, and so on over the two sides and crosswise. When the planer is placed in position it will be an easy matter to adjust the plates to the feet of the planer bed, and after this has been done the planer ways will be planed and scraped. From time to time tests will be made and if necessary the plates will be adjusted to correct the alignment.

The Empire Iron & Steel Company Sold.—Jonathan Warner of New York City, formerly connected with the American Sheet Steel Company, together with W. T. Hardesty, formerly district manager of the American Sheet & Tin Plate Company in the Niles district, have bought the plant of the Empire Iron & Steel Company, Niles, Ohio. At present the plant contains six sheet mills, two cold mills and other equipment, the product being black and galvanized sheets. It is the intention of the new owners to spend a large amount of money in extensions and improvements to the plant and some of the sheet mills will be changed to tin mills. Equipment will also be added for the rolling of steel hoops. Wade A. Taylor, who was president and treasurer, has resigned and Mr. Warner will succeed him. J. F. O'Dea has been secretary and will continue in that office. Work on the extensions and improvements that are to be made to the plant will be started at once. W. T. Hardesty will be superintendent and manager.

The Improved Heald Cylinder Grinder.

The cylinder grinder with planetary wheel action, built by the Heald Machine Company, Worcester, Mass., and described in *The Iron Age* August 3, 1905, has lately been improved in certain important particulars. The improvements include a new mechanism for feeding the wheel to the work; a clutch mechanism by which the revolving eccentrics of the head may be stopped and started while the rest of the machine is in operation; a device in the automatic feed box in the table for stopping the table when the wheel has made one complete trip in and out of the work, which is desirable when the operator is running more than one machine; and a simplified transmission between the gear box and the automatic feed box of the table.

The machine is designed especially for internal grinding on a great variety of machine parts in which long and large holes are to be finished, and where rapid removing of stock and accurate work are prime considerations. The work for which the machine is peculiarly adapted is the finishing of holes in castings of such irregular shape that it is inconvenient or impossible to rotate them in the ordinary way. In this class are double or single engine cylinders in which the center of the mass is not concentric with the center of the cylinder. The machine is made capable of doing such work by reversing the usual arrangement, and instead of revolving the work the wheel is given a planetary movement, the throw of which may be adjusted to give the required finished diameter.

Fig. 1 shows a general view of the machine; Fig. 2, a detail of the table and spindle with work on it, and Figs. 3, 4 and 5 show details of its construction. In Fig. 3 the grinding spindle is shown at A, and carries the wheel, which runs at a high rate of speed. The spindle is situated eccentrically in a second spindle B, which in turn is eccentric with the outer spindle C. The larger spindle revolves slowly, carrying with it the eccentric spindles B and A, which gives the grinding spindle a slow revolution in an orbit. The diameter of the hole ground is equal to the diameter of this orbit plus the diameter of the grinding wheel, and the diameter of the orbit depends upon the relation of the two eccentrics. When the throws of these are opposed to one another the diameter of the orbit is a minimum, the throw being only ¼ inch. When the inner eccentric is revolved until the throws of the two eccentrics are combined the orbit of the grinding spindle becomes a maximum, and the throw is 1¾ inches.

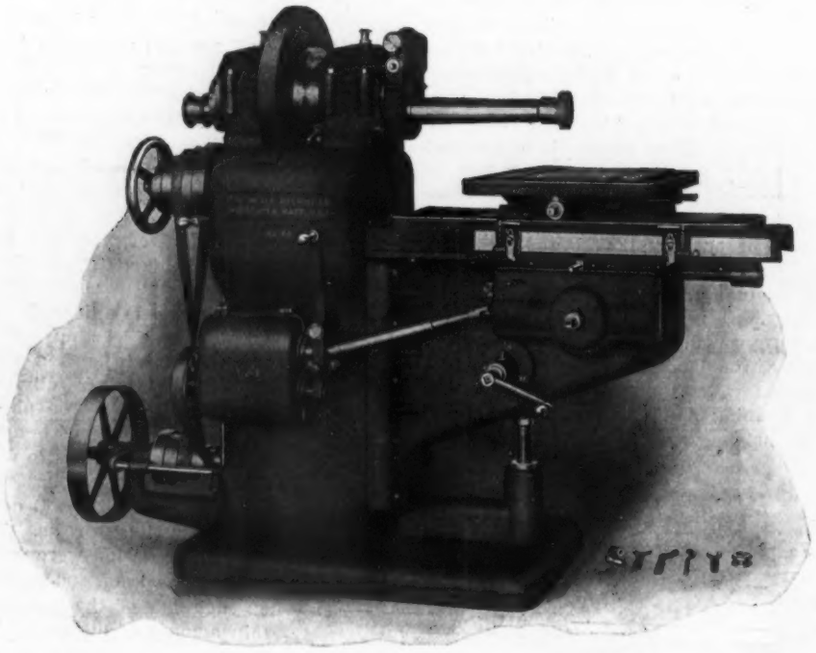


Fig. 1.—The Improved Cylinder Grinder Built by the Heald Machine Company, Worcester, Mass.

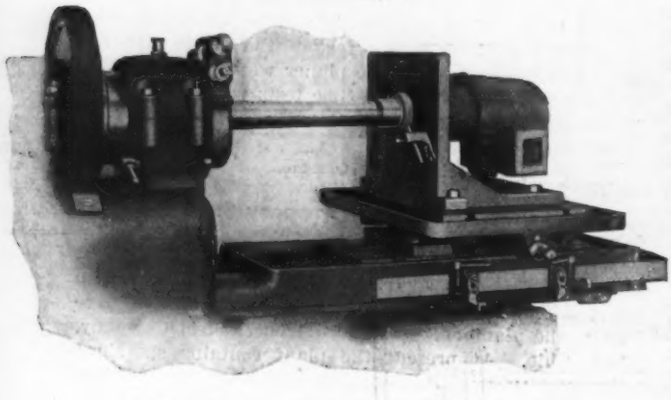


Fig. 2.—Setting the Wheel Preparatory to Grinding.

It will be appreciated that the feed, which increases or decreases the throws of the eccentric, or the orbit of the grinding spindle, must be capable of accurate adjustment. It is not automatic in the sense that at each end of the travel of the table the wheel will feed to the work, for that is not desired in this class of work. The purpose of the feed is to enable the operator to get a fine adjustment. In the original machine a simple star feed was employed, operating a worm which engaged a gear cut on the circumference of the outer eccentric. A new worm feed has been substituted, involving a novel form of star wheel feed, as shown in Fig. 3, the mechanism of which is more positive in its action. When the star wheel or cog D is rotated on its axis its motion is transmitted to the worm H, engaging a gear cut on the outer eccentric, through the gears E, F and G. It is to be borne in mind that all these parts revolve with the spindle C. The pawl K is mounted on the head of the machine, and has an elongated tooth I, which, when advanced by the handle O, is in the path of a space between the teeth of the star wheel. The amount of feed depends upon the angle of the elongated tooth to the axis of the cog, and is made such that the star wheel is rotated one tooth space at each revolution of the grinding head, which increases the throw of the grinding spindle 0.00025 inch. If a greater feed is desired the operator permits the pawl to act upon the star wheel for more than one revolution, each revolution adding the unit of feed.

The pawl is normally held from engaging the star

wheel by a spring S, which spring has the additional function of holding the pawl in the desired position for either in or out feed. The spring carries the pin T, which engages in the notches P or Q. By means of the handle O the pin T may be moved from one notch to the other, raising or lowering the pawl, the direction of the feed being thus determined. Raising the pawl causes the wheel to feed in or toward the center, lowering it to feed out and make the hole larger. The handle O has two functions: One to bring the pawl to engagement with the star wheel, the other to change the direction of feed by raising or lowering the pawl until the pin rests in one of the two notches. The blunt headed pin R enters a space in the star wheel between each feeding and insures its correct position with a tooth space in the path of the pawl, so that the latter cannot encounter a tooth. The pin being blunt does not interfere with the rotation of the star wheel.

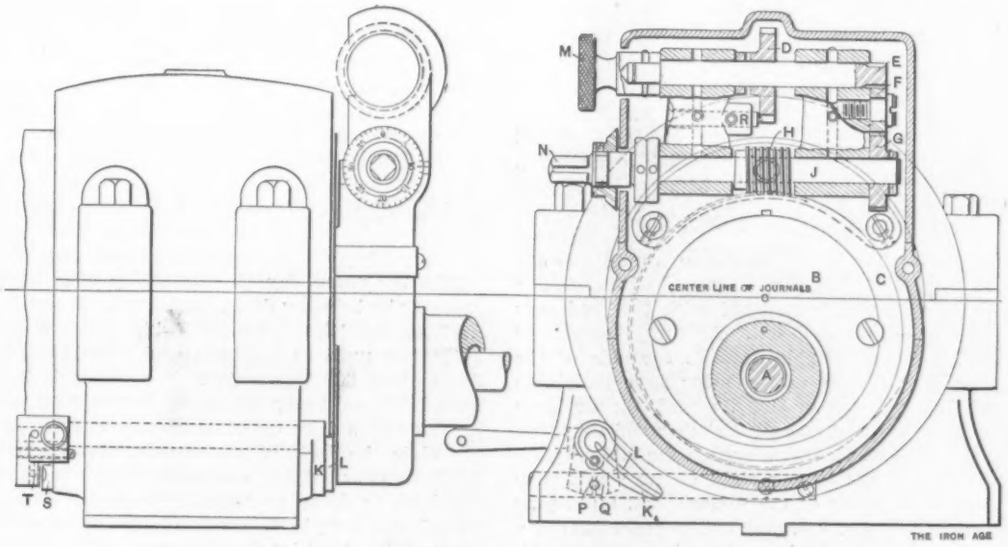


Fig. 3.—Detail of the Wheel Feeding Mechanism.

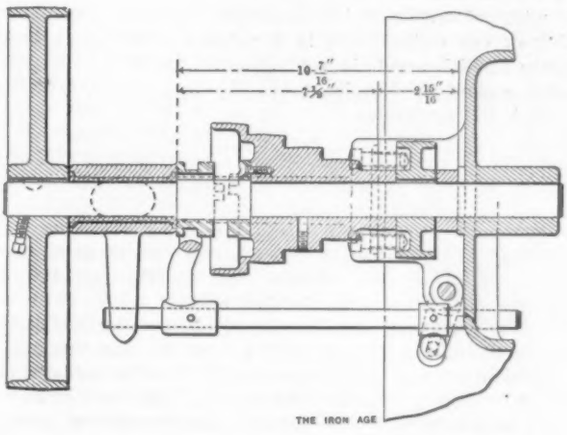


Fig. 4.—The Clutch for Disengaging the Eccentric Drive.

A graduated index disk on the worm shaft enables the operator to grind a cylinder approximately to size without calipering. On grinding duplicate work the index is set to zero after the first hole is ground to finished size, and subsequent pieces need not be calipered until the index returns to zero. The hole will then be to correct size, varying only a slight amount, possibly ¼ or ⅛ thousandth inch, due to whatever wear of the wheel may have resulted while grinding the hole. Fine hand adjustments are obtained through the knurled wheel M and rapid adjustments by a crank on the worm shaft N, this shaft being four times as rapid as the star wheel shaft in changing the throw.

When calipering work or truing up the wheel it is desirable to stop the eccentrics while the grinding spindle is still in motion. The mechanism for disconnecting the revolving eccentrics while the machine is running is shown in Fig. 4. The clutch is operated by a lever and handle at the side of the pedestal, Fig. 1.

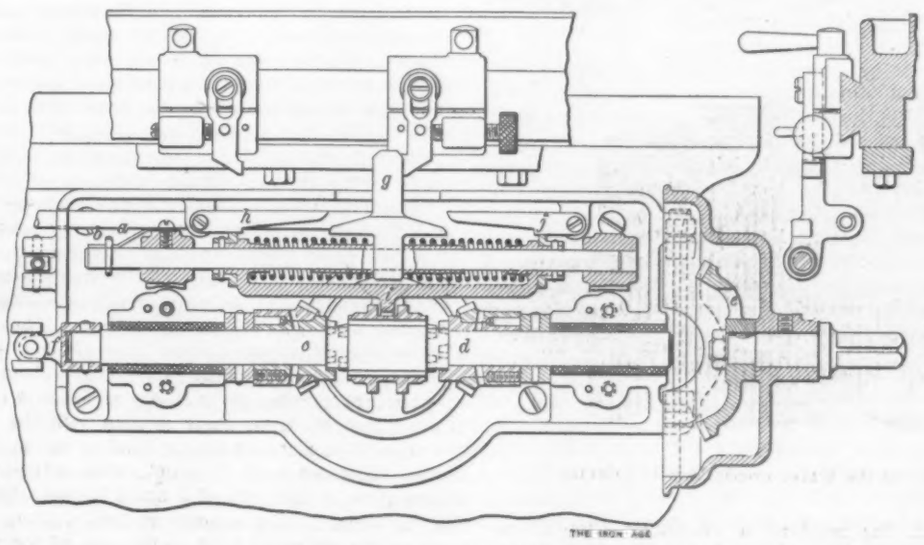


Fig. 5.—Section of the Table Feed Box.

One of the other changes in the improved machine is that the gear box has been raised on the side of the machine and the transmission through a horizontal and

vertical shaft and bevel gears, which was used on the older style, has been replaced by a telescopic shaft with universal joints, resembling the table feed of a milling machine.

Another new device is in the table feed box, which disengages a clutch and stops the travel of the table when the wheel has passed in and out across the surface of the work. This is shown in Fig. 5, and also in Fig. 1. When the clutch *c* is engaged the table is traveling out and when the clutch *d* is engaged the table is traveling so as to feed the work over the spindle. This feed box is stationary on the side of the machine and has a hinged cover swinging on the outer end. The half-tone, Fig. 1, shows the cover closed, and in Fig. 5 the cover is open and stands in a position at right angles to the bed, with the gear *e* out of engagement with the bevel gears on the feeding shaft. The gear *e* serves to transmit to *d* a motion the reverse of that of *c*. The end of the shaft *f* connects by a universal jointed rod with the feed gear box on the side of the pedestal. As the table travels during feeding the adjustable dogs on the side of the table come in contact with an extension from the clutch shipper and either reverse or stop the feed. On the inner end they reverse the feed and on the outer end they stop it. When the dogs on the table engage the sliding piece *g* it is deflected to the left or right on its shaft, compressing one or the other of the springs, and its sloping upper face lifts the pawl *h* or *j* and the compression of a spring causes the part *i* to jump sharply to engage the opposite clutch. At the beginning of an operation the clutch *d* is engaged and the table feeds in until the part *g* strikes the right hand dog and is deflected to the left until it releases the pawl *h*, which has previously dropped by its own weight, so that its shoulder held the end of *i*. As it is lifted the springs force *i* to the left, disengaging the clutch *d* and engaging *c*, which reverses the feed of the table. At the end of its outward travel the left hand dog encounters *g*, moving it to the right until *j* is released, when *c* is disengaged and *d* would again be engaged were it not for the stopping device. This consists of a flat spring, *a*, which is manipulated by a rod extending outside of the box so that it may be thrown out of the way when the feed is started. Thereafter it takes its position and intercepts the pin *b* at the end of the return stroke of the table, stopping the part *i* midway of its travel. leaving both clutches disengaged and the table stationary. To start the feed of the table again the stop *a* is withdrawn, and it cannot be thrown in until the table is reversed for its return. This mechanism is especially intended for the assistance of the operator when he is running more than one machine. The table feed may be manipulated independently of the dogs by a handle connecting with the part *g*.

The Associated Foundry Foremen of Philadelphia and vicinity held their regular monthly meeting in that city April 9. Routine business was transacted and topics pertaining to general foundry practice were discussed. A resolution to join the Philadelphia Foundrymen's Association in inviting the American Foundrymen's Association and its underlying associations, particularly that of the National Foundry Foremen, to hold its eleventh annual convention in Philadelphia in 1907 was passed and a committee, consisting of the following members, was appointed to prepare the invitation and co-operate with the Philadelphia Foundrymen's Association: W. O. Steele, chairman; Clarence R. Brown, W. A. Perrine, G. M. Benkert and Thomas G. Smith.

James Rawle, former secretary and treasurer of the J. G. Brill Company, Philadelphia, Pa., was elected president of that company, succeeding the late G. Martin Brill, at a meeting held April 9. John A. Brill was at the same time elected vice-president; Edward Brill, treasurer; M. Herman Brill, secretary; Edward P. Rawle, assistant treasurer; Wm. H. Hewlings, assistant secretary, and Samuel M. Curwen, general manager. James Rawle, the newly elected president, is a civil engineer by profession, and was for some time in the service of the Pennsylvania Railroad Company. He entered the old firm of J. G. Brill & Son in 1872.

The Lake Iron Ore Situation.

DULUTH, MINN., April 7, 1906.—In comparison with the same period last year, there is more ice in lakes Superior, Huron and Erie, and it is firmer in Whitefish Bay and St. Mary's River. It is, nevertheless, fully expected that navigation will open and vessels begin a general movement by April 15.

The ore docks are in readiness, and the ore roads have commenced to unload cars on track at the docks and to forward from the mines in a small way. On April 5 the first ore train was handled at the Allouez ore docks by the Great Northern. Unloading commenced the next day, and docks will now be in regular operation. It is anticipated that this season will be the biggest in the history of these docks, and before the season closes still another dock will be completed and in commission.

On the same day the Duluth & Iron Range began shipping by bringing down 1500 tons from the Fayal mine at Eveleth. That mine will ship about that quantity daily now until navigation opens. The Elba is sending down about 600 tons a day. Everything is in readiness for a brisk and heavy movement on this road just as soon as there is a lake outlet from the docks.

While the Duluth, Missabe & Northern has not actually commenced the movement of ore trains, all is in readiness to do so as soon as required. While the new dock is not completed, good progress is being made. A contract has been let for the construction of a classification yard at Proctor, thereby doing away with switching at the Missabe docks. This new yard will possess about 5 miles of tracks and will greatly facilitate the handling of ore trains down to the docks. Additional dock space facilities and the completion of the line to Bovey, on the Western Mesaba, make this improvement desirable, if not necessary. The erection of the new car shops indicates that Proctor will be given greatly increased importance by the Missabe system. A prominent official recently privately stated that Proctor undoubtedly would double its population within a year.

A crew of men has been started on the work of building a 4000-foot spur track to the new shaft at the Lincoln mine for the Missabe road, thereby facilitating ore movement when navigation opens.

A. F. Harvey, assistant general manager of the Pittsburgh Steamship Company, is in Duluth, and probably will remain until navigation opens. He inspected the wrecked vessels Crescent City and Mataafa, now in process of removal from where they stranded last November, and a few days later gave out the appointment of captains of the fleet for the season. All the masters of vessels faring unfortunately in the great storm last November were given first-class appointments, thereby showing that the company attached no blame to them for the several disasters, but believed that their faithfulness should be recognized by substantial berths on the most desirable vessels of the fleet.

The Cuyuna Range.

On the Cuyuna range exploration keeps up about the same as for six months past. About 30 drills are occupied. The United States Steel Corporation interests are steadily increasing their holdings by option, lease and purchase. After drilling additional ground in section 30, on the south shore of Big Rabbit Lake, where Cuyler Adams and associates showed up over 3,000,000 tons of ore, the corporation interests have started a shaft and will proceed to open up the ground in a thorough manner. Much of this ore carries manganese ranging from 10 to 28 per cent., if information given out is reliable.

On the Ehrich property, the fee of which is under option to Duluth men, the Steel Corporation now has an option for a lease, and for some months has been drilling a series of angle holes to more positively establish character of the ore deposit, as well as its quality. That there is an enormous body there in a basin on the southerly side of Big Rabbit Lake there is no doubt. As to grade and formation more knowledge is sought.

In section 30, 46-28 the corporation interests have a lease from Cuyler Adams and associates, and one hole shows 180 feet or ore. Before this lease was given Mr.

Adams showed 100 feet of ore that averaged better than 60 per cent. in metallic iron.

Menominee Range.

Favorable reports come from the Iron River-Stambaugh district. A new series of ore lenses has been encountered by the United States Steel Corporation work by drilling and drifting in the Riverton and Dober properties on the west side of the river some distance from the present workings. The lenses are thought to be an extension of ground now being worked and very likely to affect materially the life of the property. Adjoining the Riverton mine, the Stegmiller mine will be unwatered early next month. This mine has a shaft several hundred feet deep and a vein of non-Bessemer ore 30 feet wide. It made its first shipments in 1889. The old Sheridan mine, within the village limits of Iron River, will be reopened this spring. The Cambria Steel Company's Penn Iron Mining Company also has started diamond drilling within the city limits of Norway. The Buffalo & Susquehanna Company's Monroe mine is being unwatered and will ship 100,000 tons this season, an increased output. The Traders' mine at Iron Mountain will ship 200,000 tons this season. The working force will be increased and improvements will embrace work on the new shaft and a new crusher plant, together with more boiler and hoisting capacity. The hoist will handle 4-ton loads 600 feet in one minute. Pickands, Mather & Co.'s exploration on the Fogerty property at Stambaugh has shown up a body of ore 75 feet wide, with a reasonable certainty that the greater part is merchantable. The drill work is being prosecuted at the bottom of the 200-foot shaft and the ore was encountered 120 feet to one side.

Heavy Mesaba Shipments Expected.

President T. F. Cole of the Oliver Iron Mining Company has been in the Southwest accompanied by a few friends for about a month, but expects to return to Duluth, via Bisbee, A. T., about April 15, so as to be at home about the time spring operations open. The Oliver Company, while intending larger shipments during 1906 than in any previous year, is not stock piling ore more rapidly than usual; indeed at many important old range points its spring stocks on the surface are less than a year ago. In 1905 its Mesaba range operations were proportionately increased, and this year the preponderance of the Mesaba will be even more strongly shown. This is the case with the Oliver Company shipments to a greater extent than with other companies. It explains the fact that stock piles are not larger. The Oliver Company is making elaborate preparations at so many Mesaba mines for very large business, indeed must do so to carry out its contract minimums there, that it will be able to turn out an astonishing business from the port of Duluth. Should no serious obstacles intervene the season's shipping business from Mesaba range points, by all companies, will not be less than 23,000,000 tons. The Oliver company has bought a large number of steam shovels and locomotives for use in Mesaba operations at mines, stripping, mining and handling materials. Twelve standard gauge locomotives have already arrived, and 17 more are due this month. Several of the 65 steam shovels ordered for the same work are on the way.

Construction on the Western Mesaba branch of the Duluth, Missabe & Northern road has been pushed very successfully during the winter, and is now so well along that July 1 is set for its completion. At Coleraine, the seat of mining activity at the terminus of this road, three shafts are down and the ores are being developed with speed, while a few miles away, at Holman, more shafts and drifts are extending ore areas rapidly. A large stripping outfit will be placed at Holman, and much of the ore deposit at that point will be mined by steam shovel. But it is not probable that this district can supply any very large tonnage this year, as, upon the completion of the railroad, it will be necessary to take in large quantities of machinery for both mining and washing these ores. The active exploration and development of this district continue and drill work upon the Walker purchase of the Oliver Company is being conducted rapidly by many machines. Few independents are at work in the district; indeed, as a recent map showed, there is little opportunity for independent work there.

General Notes.

Shipments to Chicago from the Baraboo region continue at the rate of 250 to 300 tons per day, which seems about the present limit. The field does not expand, nor are its possibilities growing more alluring. The International Harvester Company is to erect a furnace at Chicago for foundry iron, and with this a market may be found for a larger tonnage from its Baraboo mines; but it is quite safe to say that its Baraboo ore, unit for unit, is costing fully as much as would a Mesaba ore bought on the market. The great and permanent cost of pumping at Baraboo is a feature of the situation that is of no small consequence.

At Hibbing all residents on what is known as the Finn location, belonging to the Mahoning Ore & Steel Company, are forced to move off, as the company wishes to develop the ground. The problem of finding room for the population of this place is becoming serious. It is surrounded on three sides by ore deposits of great size, and much of the town itself is over ores that must later be attacked and upon which no more building is permitted. The mining company, anxious to locate its employees comfortably and in decent and permanent quarters, finds the problem a difficult one. Hibbing will be the fourth Mesaga range town to be driven from its original ground on account of ore beneath. Sparta, the third, will be moved the coming summer in all probability.

D. E. W.

The Keystone Fence Company's Wire Mill.

The Keystone Fence Company, Peoria, Ill., manufacturer of Wire Fence, Barb Wire, Nails and Staples, is now operating its own wire mill and produces all the material required in its extensive finishing departments. This new mill has been in operation about four months and adjoins the woven fence works which has been in operation on this site for a number of years. The wire drawing, barb wire and nail departments are located in one building, 60 x 300 feet. In the wire drawing department there are 42 wire drawing blocks and in the nail department 10 machines are in operation as well as one machine manufacturing staples. In the barb wire department eight machines have been installed. The building containing the pickling, galvanizing and annealing departments is 80 x 376 feet. In addition to a pickling vat 36 feet in diameter, together with the necessary accessories, it contains two galvanizing units. Power is generated by one 500 horse-power Murray-Corliss engine and two Aultman-Taylor boilers, with a combined horsepower of 500. These are provided with automatic stokers. The woven wire fence department is housed in a building 200 x 284 feet and contains 25 machines, while ample storage facilities are provided in a warehouse, 80 x 300, with a lean-to 40 x 150 feet. The building devoted to the manufacture of nails is 40 x 150 feet. The company's site consists of eight acres and there is ample room for future extensions. The officers of the company are: Peter Sommer, president; P. W. Sommer, vice-president and general manager; J. W. Sommer, secretary, and B. L. Sommer, treasurer.

German Iron and Steel Output Still Growing.—The pig iron production of Germany, including Luxemburg, amounted in February to 935,994 metric tons, as compared with 1,018,461 tons in January, 1906, and 672,473 tons in February, 1905. The total deliveries from January 1 to February 28 were 1,954,455 tons, against 1,438,682 tons in the corresponding months of 1905. Statistics of the Stahlwerks Verband show that the total deliveries in "A" products (semifinished steel, railroad material and shapes) from April 1, 1905, to February 28, 1906, were 4,943,980 tons, exceeding the allotment for 11 months by 8 per cent., and exceeding the total deliveries in the corresponding period of the preceding year by 832,823 tons, or 21 per cent.

THE IRON AGE

1855—1906.

New York, Thursday, April 12, 1906.

DAVID WILLIAMS COMPANY, - - - - - - - PUBLISHER
CHARLES KIRCHHOFF, - - - - - - - - } EDITORS
GEO. W. COPE, - - - - - - - - - }
A. I. FINDLEY, - - - - - - - - - }
RICHARD R. WILLIAMS, - - - - - - - - HARDWARE EDITOR

Tin Becoming a Precious Metal.

The condition of the pig tin market is startling. Never before, as far as records are available, has this metal commanded the prices now current. In recent years the lowest price reached was in 1896, when tin was sold in the New York market at a little under 13 cents per pound. Since then, with the exception of 1901, when a slight recession occurred, the advance has been continuous, the past week showing sales in the New York market at 38 cents and above, which is practically three times the low price touched in 1896. This state of affairs has attracted so much attention that the statistics of imports and prices are of much interest. We have obtained from O. P. Austin, chief of the Bureau of Statistics of the Department of Commerce and Labor, the quantity and value of pig tin imports for each of the calendar years 1890 to 1905, inclusive. To these figures we have added the average annual price per pound, as shown by the import figures, and the range of New York prices for each year, the latter being taken from our own records, thus constructing the following table:

Imports and Prices of Pig Tin.

Calendar years.	Pounds imported.	Invoice value.	Free or dutiable.	Aver. per pound. Cents.	New York price. Cents.
1890	33,821,319	$6,869,645	Free of duty.	20.31	19.94 to 22.92
1891	41,146,123	8,091,363	Free of duty.	19.66	19.85 to 20.75
1892	46,821,958	9,415,889	Free of duty.	20.11	19.62 to 21.58
1893	38,471,199	7,711,325	Free of duty.	20.05	19.53 to 20.77
1893	1,713,357	295,967	Dutiable.	17.27	18.67 to 20.80
1894	22,219,605	3,418,927	Dutiable.	15.39	18.34 to 20.20
1894	17,049,023	2,525,138	Free of duty.	14.81	13.79 to 16.20
1895	54,252,045	7,405,619	Free of duty.	13.65	13.42 to 14.60
1896	44,639,324	5,848,933	Free of duty.	13.10	12.72 to 13.51
1897	55,172,571	7,415,933	Free of duty.	13.44	13.23 to 13.92
1898	62,748,399	8,770,221	Free of duty.	13.97	13.77 to 18.20
1899	71,248,407	16,746,105	Free of duty.	23.50	22.12 to 32.40
1900	69,989,502	19,458,586	Free of duty.	27.80	26.00 to 32.76
1901	74,560,487	19,024,761	Free of duty.	25.51	24.39 to 28.22
1902	85,043,353	21,263,337	Free of duty.	24.53	23.38 to 29.29
1903	83,133,847	22,265,367	Free of duty.	26.78	25.35 to 30.06
1904	83,168,657	22,356,896	Free of duty.	26.88	26.14 to 29.27
1905	89,227,698	26,316,023	Free of duty.	29.49	28.42 to 36.45

These statistics have been extended to cover the years back to 1890, so as to include the period when a duty of 4 cents per pound was imposed on pig tin under the provisions of the McKinley tariff act of October 6, 1890. That act contained the following specification as to tin:

> On and after July 1, 1893, cassiterite, or black oxide of tin, and bar, block and pig tin, per pound, 4 cents; provided, that unless it shall be made to appear to the satisfaction of the President of the United States (who shall make known the fact by proclamation) that the product of the mines of the United States shall have exceeded 5000 tons of cassiterite and bar, block and pig tin in any one year prior to July 1, 1895, then all imported cassiterite, bar, block and pig tin shall after July 1, 1895, be admitted free of duty.

At the time this act was passed efforts were being made to develop the tin deposits of the Black Hills in South Dakota, and some attention was being paid to discoveries of tin ore in Virginia, California and other portions of the United States. As the McKinley tariff act imposed a protective duty on tin plates for the avowed purpose of establishing the industry of manufacturing tin plates in this country, it was deemed desirable by those who favored the measure to extend some encouragement to the miners of an essential raw material in that industry in the effort to make the United States wholly independent of foreign sources of supply. The duty on pig tin was duly imposed July 1, 1893, but it was not continued for the whole of the two years specified in the McKinley act, as the Wilson tariff act, restoring pig tin to the free list, went into effect August 28, 1894. In the table above given, the dutiable period is separated from the free periods, so that those who desire to compare the imports and prices can do so, although the dutiable period was so short that the inferences drawn are hardly likely to be of much value.

Thus far all efforts to produce tin commercially in this country have been futile. We are still dependent upon foreign sources of supply. These are mainly the Straits Settlements on the Straits of Malacca, which produce about 60 per cent. of the world's supply. Next in order of output come the Banka and Billiton islands in the Dutch East Indies, Bolivia, Australia and Cornwall, England. The world's supply for the past seven years, as compiled by C. Mayer, secretary of the New York Metal Exchange, has been as follows:

World's Supply of Pig Tin.

Years.	Gross tons.	Years.	Gross tons.
1899	70,525	1903	89,000
1900	77,200	1904	92,400
1901	84,750	1905	90,550
1902	87,970		

A comparison of our import figures with those of the world's supply shows that this country takes about 44 per cent. of the total. While our requirements have been steadily increasing, the world's supply has also been increasing in about the same ratio until the past year, when for the first time in a long period it fell below the previous year. The reduced production may be due to the conditions set forth as follows in a recent letter from the Straits Settlements, published in a Malaysian newspaper, regarding tin mining in Perak, which is the leading tin producing State in that district:

> The year 1905 was a bad one for the small miner in Perak. If the output of such large mines as Tronoh, Gopeng and French Mining Company, &c., be added together and subtracted from the total output, the amount that the small miners have produced will then be seen, and the true reason for trade depression understood. As a matter of fact, the country is undergoing an economic change in its conditions. The shallow mines are being exhausted; the price of food has risen 20 per cent. during the last two years, and the wages of coolies have risen in the same proportion. Not only have wages risen, but the quality of the food required has risen also. Machinery and labor-saving appliances are becoming more and more essential to success, and the time of coolie labor and surface working is passing away.

Whatever the conditions may have been in other tin mining localities to cause a reduced output they appear to have had that effect. As the consumption has increased it has therefore been possible for large operators in the European tin markets to corner the supply and run up the price. Unquestionably, current prices have no sort of relation to the cost of production in the Malaysian Peninsula or anywhere else. The supply of the metal being largely under the control of a few interests they are able to dictate prices to consumers, whose requirements are steadily increasing. The prices now prevailing are exorbitant, and yet they may be advanced still higher. If we have entered upon a period of sustained high prices, as now seems probable, relief should be sought in an increase of production. Thus far, in this country, the exploitation of tin deposits has been done by mineral prospectors and rarely if ever under the direction of competent mining engineers. It would seem as if the time had arrived for capital and mining experience to join hands and seriously undertake the task of finding some dependable source of tin supply within our own territorial borders.

Record Breaking Pig Iron Production in March.

March is a month in which blast furnace and steel works managers count on making record outputs. It gives 31 days' production for blast furnaces and ordinarily has 27 working days for steel works and rolling mills, and the effort of superintendents and foremen is to make as great a disparity as possible between the tonnage for March and that for the short month of February. In the sections of the country in which pig iron and steel production is greatest February is not only the coldest month of the winter, but heavy snows add their handicap, so that the results of iron and steel works operations in that month are ordinarily unsatisfactory. In 1905 March was an unusually favorable month from a meteorological standpoint, mildness succeeding the rigors of February, and it will be remembered that it was signalized by the greatest number of tonnage records in the Central West, as well as in the South and East, ever reported in one month. Pig iron production in the United States ran up to the unprecedented figure of 1,970,000 tons, and the reduction in stocks was sufficient to bring the apparent consumption up to a round 2,000,000 tons. The achievement was commented on as remarkable and significant.

This year, while March was more unfavorable than February, so far as weather conditions are concerned, there seems to have been a spurring to new records in a good many directions. The United States Steel Corporation blast furnaces produced 1,001,226 tons, as against 947,476 tons in October, 1905, which was their best previous record. The corporation's steel ingot production, 1,268,933 tons, was also a record, being nearly 90,000 tons in excess of the best previous total, 1,179,267 tons in January. While some blast furnaces, owing to heavy snowfall and to the accumulating effects of long sustained operations at high outputs, did not maintain their February rate, the reports to *The Iron Age* show that the March production of the coke and anthracite furnaces of the country was well in advance of the high record made in January. Counting the production of charcoal iron as at the same rate as in 1905, the pig iron output of the country in March was close to 2,200,000 tons. Stocks, so far as reported, indicate a very slight decrease, so that consumption and production are now practically in balance. The extent of the increase in pig iron production in March over January will appear in the statement that in January the furnaces were producing at an annual rate of 25,350,000 tons, while the March rate would amount to 25,850,000 tons in a year.

Municipal Ownership in Chicago.

The Chicago traction situation was still further confused and befogged by the referendum vote cast last week on the question of the municipalization of the surface roads and no improvement in the shockingly bad service offered the public is promised until a definite solution is reached. A long drawn out legal controversy to test the validity of the ordinance authorizing the purchase of the tangible property of the roads will further delay the replacement of ancient operating facilities with modern equipment, and a long suffering public with Spartan fortitude will await the slow grind of the courts for a solution of the problem.

An almost inextricable and paradoxical situation has resulted from this election. By the adoption of one proposition the municipality is instructed to borrow $75,000,000 for the purchase, construction and equipment of street railroads; another advises that their operation "proceed without delay," and the defeat of the third strictly forbids municipal operation. If the courts sustain the ordinance authorizing the issuance of certificates for the purchase of surface lines the properties will have to be leased to some private corporation and municipal ownership without operation will result. In the meantime the roads will operate in the streets of Chicago by sufferance only, as the 99-year franchise extension was declared invalid by the United States Supreme Court, and while a few grants have not been affected, the right to operate over some portion of every continuous line has been denied these corporations. Efforts will be made by the city administration to collect suitable compensation for the use of the streets pending a court decision, and a seizure of the properties is threatened if no amicable agreement can be concluded.

That a tremendous change in sentiment has taken place during the year regarding the elusive doctrine of municipal ownership was indicated by the small majority of less than 3500 which carried the proposition for the purchase of the roads, as compared with 82,000 recorded in favor of this policy in 1905. In the meantime the public will continue to suffer and bear the inconveniences resulting from this tangle and no relief can possibly be promised until the Supreme Court considers the legality of the loosely prepared ordinance passed by the Chicago Council and accepted by its citizens.

Sustained Railroad Buying.

Much of the heavy contracting for cars that began in the late months of 1904 and grew to entirely unprecedented proportions in 1905 was based on prices considerably below those now quoted for deliveries in the latter part of this year. It is good proof of the imperative need of carrying facilities quite beyond those provided in the past six months that the railroads of the country have continued to place orders on this higher level of prices at a rate equal to the average throughout last year for cars and at a greater rate for locomotives. The *Railway Age's* figures for 1905 showed that 341,315 freight cars, 3289 passenger cars and 6265 locomotives were ordered last year, while the car and locomotive works actually built in the year 165,455 freight cars, 2551 passenger cars and 5491 locomotives. The same journal computes from incomplete returns covering the first three months of 1906 that nearly 83,000 freight cars, 576 passenger cars, 1575 electric cars and 2000 locomotives have already been ordered. It will be noted that the rate at which car orders have been placed in the first quarter of this year is practically up to the average rate of new orders throughout 1905 and that the locomotive orders this year have been going to the works at a considerable increase over the rate in 1905.

The figures are significant, and especially so in conjunction with the booking of more than 2,900,000 tons of standard section rails for delivery in 1906 and the placing of a good tonnage of bridge work. While the first quarter of the year has not produced notably large new contracts in mill products apart from rails, the fact that the railroads have kept up their buying argues for a prolongation far on into the year of the present rate of production of the heavier forms of finished material. In the entire year 1904 the railroads gave orders for 136,561 freight cars and 2538 locomotives. Thus the business placed between January 1 and March 31 this year was 60 per cent. of all the freight cars and 80 per cent. of all the locomotives ordered in 1904.

It is evident that the railroads are not to allow the conditions in the money market to prevent the carrying out of their improvement programmes for this year. How

the more than $500,000,000 of new bond and stock issues which the railroads have announced since the opening of the year in furtherance of new construction and new equipment plans are to be absorbed has been for some weeks the problem of the financial world. While the moneyed interests have been searching for ways and means the railroads have shown one way out by resorting again to the issue of notes for two or three years, paying a rate of interest from ½ to 1 per cent. above that which long term bonds would carry. In the past week one road has sold $6,000,000 of such notes, another has sold $7,500,000, and other like issues are expected. In 1903 money conditions far less promising than those of to-day were met in this way, and a repetition of the procedure now may permit of the more deliberate digestion of the securities that are coming forward too rapidly for the good of the country's financial health.

The Annoyance of Erroneous News.

Much trouble is caused to manufacturers by erroneous or exaggerated announcements of plans for improvement. This is always true, but during a period such as this, when every energy is being directed to taking care of a load of good business, the annoyance is doubly trying. The daily press and a portion of the commercial press are frequent offenders in this respect. Published announcements of this description oftentimes are given wide circulation, as they are copied here and there without attempt at verification. As a consequence, when it is stated in the public prints that a manufacturing establishment is to be enlarged, when such is not the case, or if a trivial improvement is multiplied into large works, there follows a flood of advertising literature, a deluge of letters from dealers, manufacturers and contractors, and a continuous round of calls from salesmen, all to nobody's good. Naturally there is impatient complaint. The office is distressed if the effort be made to answer all resulting correspondence, and sometimes the replies stating that the company is not in the market for anything are received with skepticism and the business is followed up as if it existed. It is also a strain to meet civilly the traveling representatives of dealers and manufacturers who have taken the published statement in good faith. The consequence of the few lines of unfounded news becomes costly in dollars and cents as well as in good will.

Any lot of 100 clippings relating to industrial development reveals about the same percentage of accuracy. Some 10 or 15 per cent., perhaps a little higher at times, may be entirely correct. As much will be entirely incorrect. Those of the remaining class range in degree of error from names wrongly stated to the barn or lean-to grown under rumor's or the reporter's exaggeration to large additions which would require the purchase of many thousands of dollars of equipment and materials.

Occasionally a manufacturer complains that the publication of exact facts concerning his building plans is the source of much trouble and begs to have no mention made of them. He dreads the consequences in the numerous inquiries that will come and the increase in the volume of his mail. But in most such instances there is no regret when the knowledge is received which comes with the efforts of those who would have him for a customer. He is put in possession of much information which could not have been had otherwise. He learns of new machines or new materials. He may save money from the substitution of newly learned ideas for those which have been worked out in advance of this information. His newly acquired library of catalogues and price-lists contains a great deal of valuable matter for his reading or for the study of his engineers or architect or superintendent. His purchasing agent may buy to better advantage, perhaps cheaper, in a more widely extended market. Probably, everything being considered, few manufacturers who have had the experience would dispute the statement that full publicity of plans is as valuable when it is proposed to make extensive additions in buildings or equipment as it is troublesome when untruthful report is given circulation by the press. Manufacturers appreciate the effort to secure correct information in the same degree that they resent the interference with their business that comes with the publication of what has no real foundation in fact.

The Philadelphia Foundrymen's Association.

There was a large attendance of members and guests at the 156th regular meeting of the Philadelphia Foundrymen's Association, held at the Manufacturers' Club in that city April 4.

Thomas Devlin, president, occupied the chair. The report of the treasurer showed the association to be in a flourishing financial condition, there being a balance amounting to $2422.27 on hand, with all indebtedness paid. Applications for membership of the Monarch Engineering & Mfg. Company, Baltimore, Md., represented by H. D. Harvey, and the Cyrus Borgner Company, Philadelphia, represented by Cyrus Borgner, were favorably acted upon.

A communication from the American Foundrymen's Association was read announcing the date of the tenth annual convention of the association, to be held in Cleveland, Ohio, June 5, 6 and 7, 1906, and to which the foundry trade is invited. After considerable discussion it was decided to invite the American Foundrymen's Association to hold its eleventh annual convention, in June, 1907, in Philadelphia, and the following committee was appointed by the president to prepare and extend the invitation: Dr. E. E. Brown, chairman; George C. Davies, Thomas Evans, Stanley G. Flagg, Jr., C. W. Asbury, W. S. Hallowell, E. H. Mumford, W. O. Steel, A. A. Miller, Cyrus Borgner, W. A. Pollock-Davis and President Thomas Devlin and Secretary Howard Evans, ex-officio.

The paper before the association was entitled "Molding Sand and Mold Wash for Making Steel Castings," by Arthur Simonson of Wm. Wharton, Jr., & Co., Philadelphia. Mr. Simonson treated the subject from the standpoints of the adaptability of the various materials for this use, the mixing of the sand and clay and the mechanical properties encountered in making the molds. The uses of materials for core making were also elaborated upon. This paper was printed in full in *The Iron Age* for October 19, 1905, under the title "Preparation of Molds for Steel Castings."

Dr. Elmer E. Brown, chairman of the delegation visiting the Pittsburgh Foundrymen's Association April 2, made a report covering the many interesting points visited by the party. Members and friends of the association numbering 31 left Philadelphia April 1 in a special Pullman car, returning immediately after the banquet on Monday evening. The delegation was particularly pleased with the hospitality of the Pittsburgh Association, and the thanks of the delegation and the association as a whole were extended to the Pittsburgh Association for the invitation and entertainment. After a vote of thanks to Mr. Simonson for his interesting paper and to Dr. Brown for his report of the Pittsburgh visit the meeting adjourned.

Some excellent records for output were made in March at the Clairton blast furnaces and open hearth steel plant of the Carnegie Steel Company. The three blast furnaces turned out 39,599 gross tons of Bessemer pig iron, while the steel plant, which contains twelve 50-ton furnaces, made slightly over 55,000 gross tons of ingots. The cost of making pig iron and steel at this plant in March was also remarkably low.

Hearings on the Shipping Bill.

WASHINGTON, D. C., April 10, 1906.—The House Committee on the Merchant Marine and Fisheries on the 4th instant began a series of hearings on the ship subsidy bill. During the sessions that have since been held a large number of witnesses have been heard both for and against the measure, the majority, however, advocating its speedy passage. During the current week Chairman Gary of the United States Steel Corporation will testify with regard to the relative cost of producing steel plates and other forms of steel for shipbuilding in the United States and in the leading manufacturing countries of the world.

Opposition to Bill.

One of the first witnesses heard by the committee was George L. Duvall, chairman of the Committee on Ship Subsidies and Shipping of the Merchants' Association of New York, who presented an amendment to the bill providing that all commercial subsidies should be confined to American built ships and that until such ships were ready to carry the mails to South America and other ports, foreign ships should have the contracts. Under cross examination Mr. Duvall conceded that the effect of his proposition would be to eliminate all foreign built ships of American registry from the benefits to be derived from the measure, but would admit foreign built ships of foreign registry to the mail subsidies. The position of the Merchants' Association in advocating legislation in the interest of foreign shipping was severely criticised by members of the committee during Mr. Duvall's testimony, and also during the statement subsequently made by J. Hamden Dougherty, counsel for the association, who undertook to defend it from the charge of being biased in favor of the foreign lines.

Conditions in Shipbuilding Industry.

An interesting statement with regard to the conditions prevailing in the shipbuilding business from the mechanic's standpoint was presented to the committee by John McNeill of Kansas City, ex-president of the National Brotherhood of Boilermakers and Iron Shipbuilders. He said that but for the coastwise service and the additions to the navy there would be practically no shipbuilding in the United States at the present time; many skilled mechanics were leaving the shipyards to find employment elsewhere and the outlook was exceedingly gloomy.

Secretary W. L. Marvin of the Congressional Maritime Commission presented some figures showing the rates of wages paid in the shipbuilding industry in the United States and abroad, demonstrating the high cost of construction in this country.

William Livingstone of Detroit, Mich., president of the Lake Carriers' Association, and G. A. Tomlinson, a prominent grain shipper of Duluth, Minn., strongly urged the passage of the bill, with a view to supplying transportation facilities for the enormous agricultural output of the country tributary to the Great Lakes. Mr. Livingston expressed his surprise that any opposition to the bill should come from the Middle West or the lake region, for while the immediate beneficiaries would be the shipbuilders and shipowners of the Atlantic and Pacific Coasts, any advantages that they might secure would be of enormous importance to the producers of the interior and would guarantee them a market for their products at all times.

The committee having expressed the desire for some accurate statistics as to conditions among the mechanics in the shipbuilding industry, Patrick Donohue of San Francisco, vice-president of the National Brotherhood of Boilermakers and Iron Shipbuilders, testified that of 10,000 boilermakers on the Pacific Coast 50 per cent were at present unemployed. Of 123 vessels built in the United States last year only nine were ocean going.

Alexander Cochran of Bath, Maine, a shipbuilding subcontractor, spoke of conditions in the Bath yards, declaring that there is practically no work to be had now except a few tow boats and an occasional small Government vessel. There are seven shipyards in Bath, with only two vessels now building in the entire number. He declared that if the pending bill had been a law during the Spanish War the Government would have been able to secure plenty of first-class vessels instead of buying rattle-traps from foreigners at exorbitant prices. While these foreign vessels were being transformed into transports, he said, he had driven a hammer through their shells and it was surprising that the use of these vessels did not result in some terrible catastrophe.

Outlook for Measure.

It is now believed that the committee stands ten to eight in favor of reporting the bill and that a comfortable majority for the measure can be secured in the House, provided the speaker will permit it to be called up. Mr. Cannon has long opposed this class of legislation and the principal efforts of the advocates of the measure are now being directed to inducing him to permit its consideration before the adjournment of the present session.

W. L. C.

Bisbee Copper Mine Pumps.

BISBEE, ARIZ., March 31, 1906.—This camp is noted in the Southwest for the quantity of water some of its mines are pumping. For four years the Calumet & Pittsburgh has thrown from 2000 to 2700 gallons per minute from an average depth of 1000 feet, while a neighboring shaft, for a shorter time, has been delivering about 1000 gallons per minute. At the Briggs shaft of the Calumet & Pittsburgh is a station equipment of 3000 gallons per minute capacity in triple expansion Prescott pumps, while at the adjacent Junction shaft is a similar capacity in three 1000-gallon units. Both these shafts belong to the so-called Cole properties, in which Duluth, Calumet & Pittsburgh men are interested.

These two companies have just let contracts for Prescott pumps that will materially increase their capacity for handling water and that indicate also the general course of development planned for the next few years. For the Briggs shaft there is to be added a 20 and 38 inch by 6½ x 36 inch cross compound and condensing pumping engine to go on the 910-foot level, to throw to surface, reinforcing the battery of pumps already located there. This machine will have a normal capacity for 1000 gallons per minute. Also for the same shaft is to be added a 15 and 23 and 39 inch by 14½ x 24 inch triple expansion, condensing, direct-acting engine of 2000 gallons per minute capacity. For the present, or as soon as the shaft reaches that depth, this machine will be located on the 1330-foot level, but will later be moved down to 1530 feet. The shaft is now 1130 feet deep.

At the Junction mine a different method of operation will be carried out. There an 18 and 34 inch by 8 x 36 inch cross compound condensing Corliss engine will be installed on the 1500-foot level. It will shamble water to the large present battery, which will be placed at once on the 1000-foot level. This new pump will lift 1500 gallons per minute. The addition of this heavy equipment will put both these shafts in excellent shape to continue safely sinking to depth.

Adjoining the Junction lies the Denn-Arizona mine, belonging to other Duluth parties. This now has a shaft down 1050 feet, still in the overlying conglomerate of the district, but doubtless very close to the older sedimentaries. It is quite certain to cut much water soon. This company has ordered two 15 and 23 and 39 inch by 10 x 24 inch triple expansion station pumps, each good for 1000 gallons a minute from the 1050-foot level, also three 800-gallon sinkers to feed them.

Aside from the above there are at Bisbee mines now some 11,000 gallonage of station pumps, throwing from various depths down to 1200 feet. It is by far the heaviest installation in the Southwest and is approached by nothing except the neighboring plant of the Tombstone Consolidated Mining Company, with its 8500 gallons of station and sinking pumps.

D. E. W.

A congress of the International Association for Testing Materials will be held in Brussels, Belgium, September 3-8, 1906. The last congress was held in Buda-Pesth, Austria-Hungary, in 1901.

Recent Customs Decisions.

Parts of Plows.

It has been decided by the Board of General Appraisers that parts of plows cannot be admitted at the rate of duty provided for plows. The board's action was the outcome of a protest filed by F. B. Vandegrift & Co. against the assessment of a 45 per cent. duty under the provision in the tariff law for manufactures of metal. Plows are specially provided for in paragraph 460, which imposes 20 per cent. upon entry. The board holds that as paragraph 460 contains no reference to "parts" of plows the incompleted articles must be relegated to paragraph 193.

Automobile Motors and Parts.

The customs authorities at New York have imposed very heavy advances, in some instances nearly 100 per cent., over invoice prices on motors and other parts of automobiles shipped from Paris by O. H. Jones. The identity of the New York importer of the articles has not been revealed, owing to the reticence of the appraising officials. Under the provisions of the Customs Administrative act goods advanced 50 per cent. or more on final reappraisement are seized by the United States. Whether this procedure will be followed in the present case depends on the action to be taken by a subboard of three general appraisers, which will review the return of values made by the collector and by a single general appraiser. As there is a penalty of 1 per cent. for each 1 per cent. of advance over entered values it will be seen that the actual increase over the invoice prices on some of the merchandise aggregates almost 200 per cent.

How the goods came to be undervalued to such an extent the authorities refuse to say. When the motors reached New York Collector Stranahan received a report from Appraiser Whitehead to the effect that the motors, or certain of them, were heavily undervalued, whereupon the collector raised the invoice prices and demanded duty at the rate of 45 per cent. on the increased valuation under the provision in the Dingley tariff for "manufactures of metal." In addition, the collector demanded the accruing percentages of advance and penalties. The New York representative of Mr. Jones thereupon filed an appeal for a review of the collector's action to the Board of United States General Appraisers. Under the practice of the customs court the matter was referred to a single general appraiser for investigation and decision.

The case was referred to General Appraiser Fischer, an expert on automobile values. That official carefully considered the evidence submitted by both the importer and the Treasury Department. It is apparent that Mr. Fischer in the main at least sustains the collector in raising the invoice prices. As illustrating the advances, it may be stated that 60 horse-power motors were advanced by the collector and affirmed by the single general appraiser from 3370 francs each to 6625 francs each, 40 horse-power motors from 2870 to 3560 francs each and *boites vitesse* from 1200 to 2100 francs each. The only recourse left to the importer is to appeal to a board of three appraisers and secure a reversal of Mr. Fischer's reappraisement below the seizure line. Otherwise the merchandise stands a strong chance of being formally seized and sold at public auction.

Nickel Anodes.

The Board of United States General Appraisers handed down a decision April 5 in the action brought by Hermann Boker & Co., New York, to determine the customs classification of so-called nickel anodes. The board denies the contention of the importers for duty at the rate of 6 cents per pound under the provision in the Dingley tariff for nickel in bars or sheets, and holds that the collector made no error in returning the merchandise at 45 per cent. under paragraph 193. The latter paragraph provides for articles of nickel not specially provided for, whether partly or wholly manufactured. At the hearing granted by the board a sample of the merchandise was introduced into evidence by the importer. The sample was a piece of nickel about 12 inches long, 6¼ inches wide and 7-16 inch thick. The sample had no holes drilled in it, while the invoice description of some of the articles indicated that they had been drilled.

General Appraiser Fischer, who writes the decision for the customs tribunal, says that to bring the goods within the provisions of paragraph 185 they must be shown to be "pigs, ingots, bars or sheets." According to the general appraiser the evidence failed utterly to show that the anodes are either bars or sheets, the only testimony on this point being an expression of opinion on the part of the importer that the articles would come under the description of articles provided for in paragraph 185.

Basic or Acid Steel for the Manhattan Bridge.

The Department of Bridges of the City of New York has put out this week new specifications and forms for bids on the Manhattan Bridge over the East River between the boroughs of Manhattan and Brooklyn. The contract for this bridge was once let to the Pennsylvania Steel Company, but the award was enjoined and the courts held that the contract was void because of the form of the specifications concerning steel, which, it was alleged, did not afford opportunity for free competition. The important difference between the new specification and that of 1905, which was given quite fully in *The Iron Age* of July 27, 1905, is that while the latter permitted only acid open hearth structural steel, the provision on this point in the present specification is simply that "all structural steel shall be made in an open hearth furnace," so that basic steel is eligible. It is provided that decarburization below 0.12 per cent. carbon will not be allowed. Last year's specification put a limit of 0.10 per cent. of phosphorus and 0.04 per cent. of sulphur on the stock used in the open hearth furnace. The sulphur limit has now been increased to 0.07 per cent. The ladle tests of steel last year imposed the limit of 0.04 per cent. phosphorus, 0.04 per cent. sulphur, 0.60 per cent. manganese and 0.10 per cent. silicon. These are retained, except that in acid steel phosphorus may go to 0.06. The same difference appears in the requirements for rolled nickel steel. The steel castings also may be made either by the acid or the basic process.

The amount of steel required is about 42,000 tons, of which 2700 tons are for anchorages, 12,500 tons for towers, 9000 tons for main span, 9700 tons for side spans and 8000 tons for cables. The bids will be opened on Monday, April 30, 1906.

A Simple Slide Rule Formula.

In designing a table for the use of those owning slide rules, a correspondent of *Engineering* tried to devise a simple formula for obtaining the sine of an angle when printed tables were not available. He worked out a formula which gives very close approximations for angles under 80 degrees. This formula, still further simplified, is as follows: Sine $X = .0174\ X - 0.000{,}000{,}81\ X^3$. If, for example, we wish the sine of 30 degrees, which is 0.5000, we find it by the formula to be $0.522 - 0.02187 = 0.50013$, which shows an error of 1 in 4000, approximately. Below 30 degrees and above 70 degrees the formula gives a result below the true one, while between those limits the formula reads a little too high. The table may be of interest:

Angle. Deg.	Sine by formula.	By table.	Error.	1 in
5	0.0869	0.08716	0.00026	335
20	0.34152	0.34202	0.0005	683
30	0.50013	0.50000	0.00013	3,847
40	0.64416	0.64279	0.00137	469
45	0.7092	0.70711	0.00209	337
60	0.86904	0.86603	0.00301	288
80	0.97728	0.98481	0.00753	127
90	0.93	0.98481	0.05481	18

It is seen that for angles above 80 degrees the error is subject to a rapid increase but that below that angle the percentage of error is well within the elasticity permitted in most engineering work.

The Colorado Fuel & Iron Company is to build six additional open hearth furnaces, and will remodel the soaking pit equipment.

Effects of Vanadium in Steel.

In a paper on "Vanadium as a Steel Making Element," read by J. Kent Smith before the Liverpool Section of the Society of Chemical Industry on March 15, 1906, the author stated that the chief source of vanadium at present is a vanadium lead ore mined in Spain. Ferro-vanadium containing up to 30 per cent. of vanadium is manufactured by the new Vanadium Alloys Company at Llanelly in South Wales. This ferro-vanadium alloy is employed in the manufacture of the special vanadium steels now produced on a large scale by Williams & Robinson. These steels are being turned out at the rate of 800 tons per year, and 80 per cent. of this output is being taken by motor car manufacturers. In one case 150 crank shafts of chrome vanadium steel were ordered and are now running with satisfactory results, and an additional order for 400 crank shafts has been given. This chrome vanadium steel has also been exported to France, although an import duty of £5 per ton has to be paid upon it. The amount of vanadium used in manufacturing these special steels varies from 10 to 20 per cent., and as vanadium is still half the price of silver, even this small percentage adds considerably to the cost of the steel.

The effect of vanadium upon ternary and quaternary steels appears to be chiefly to retard segregation of the carbides on cooling. In one way it may be looked upon as a kind of automatic tempering agent, which intensifies the physical changes due to oil tempering. The author stated that nickel vanadium steels, although showing great strength, are far below the chrome vanadium steels in resistance to alternations of shock and torsional strain, and that it is from the chrome vanadium steels that the greatest service is to be expected in motor car work and other similar uses. The effect of adding vanadium in small amounts to ternary and quarternary steels is to increase greatly their resistance to dynamic tests without depreciating their value as revealed by static tests, and the author gave many figures in support of this statement.

In ordinary mild structural steel one may increase the breaking stress to a very considerable degree by special heat treatment, but the impact test figure falls then in a much greater ratio. On the other hand, a chrome vanadium steel after annealing will pass a dynamic test double that of high class carbon steel and at the same time show a very high resistance to tortional strain, and by oil tempering these properties can be still further increased. One of these chrome vanadium steels after special heat treatment has stood a tensile strength test of 103 tons per square inch, while at the same time showing a high resistance to dynamic test and torsional strain. This is a combination of properties which has not been attained before with any steel. The author gave details of a rapid colorimetric method for determining vanadium in presence of chromium and phosphorus.

Oxone.

A new product of the Niagara Electro-Chemical Company, Niagara Falls, N. Y., is Oxone, which is a specially prepared fused form of sodium peroxide that has the peculiar property of emitting free oxygen when it comes in contact with carbon dioxide charged with moisture. This fused sodium peroxide is bluish-gray in color and is cast in small blocks that can be placed in airtight cans and in this form easily transported. Its weight is about 2½ times heavier than water.

The inventor or discoverer of Oxone is George F. Brindley, who for some years has been works manager for the company. The importance of the discovery is best understood when it is known that it is believed that by the use of Oxone the air in submarine boats may be kept fresh and constant in supply of free oxygen, so that the boats can keep running or out of sight under water many hours at a time. Experiments made in Niagara Falls are alleged to have fully demonstrated its value. A man was placed in an airtight box 3 x 6 feet in size, 2 pounds of Oxone being placed in the box when it was sealed up. According to mathematical calculation, the supply of air in the box was only sufficient to sustain the man's life for about 20 minutes, at the end of which time he should have succumbed to asphyxiation, but instead he smoked and read, remaining in the box six hours without distress, but with exhilaration.

It is predicted that Oxone will be found useful in deep mining, also in the hands of physicians who need an immediate supply of free oxygen in the treatment of various cases, pneumonia, for instance. It will also be available for purifying the air on sleeping cars.

Air Furnace Bottoms in Malleable Practice.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, writes in the *Foundry* of the results of an inquiry as to the experience of malleable founders with the bottoms of air furnaces. The difficulty sometimes experienced in keeping reverberatory furnace bottoms in good shape suggested the questions asked, which related to the size of heats, number of heats made with the same bottom, the material used for the bottom and the particulars of bottoms "coming up." Twenty replies were received, which are summarized in the following:

The heats ranged in size from 7 to 18 tons. Practically all the foundries use some form of fire sand for making bottom, that is to say, a sand with silica content of over 95 per cent. Furthermore, the fluxing impurities, such as lime, alkalies and oxide of iron, must be very low, but yet enough to just bake the sand together, or "set" it when properly fired. In making bottom the sand is spread on in layers of 1 inch or more, and fired to set it. This takes 15 minutes. About 5 inches are put on in this way, the process being similar to that made use of in the open hearth furnace. In the latter case, with careful patching after each heat, a bottom should last up to 1000 heats. In the case of the air furnace some founders preferred to take off only three heats before renewing bottom, but in each case stated that they could take off more without risk if they chose. Other founders get from 6 to 12 heats off their bottom, and these figures cover the majority of replies. The two exceptions were as follows: The first, with a natural draft air furnace, gets 30 heats from the same bottom. In the second case, with a production of 29 heats of 14 tons, the bottoms are made by mixing ground fire brick with the fire sand.

While the method of making bottom as above described was the usual one, there were some slight variations. Thus, several foundries make the 5-inch bottom all at once. One founder uses a top dressing of core sand ½ inch thick. Another uses salt or fire clay or both in his fire sand. Several add ground fire brick. All concur in emphasizing the necessity of thoroughly drying out each layer before the next is put on, and especially the junction between the old and the new sand on the bottom. In case the furnace foundation should draw dampness, it is advisable to erect a concrete box for the base, and fill in with broken fire brick before building up the furnace.

The term "fire sand" is used advisedly, for it covers a number of appellations. Thus "silica sand" is much used, though sand itself is silica of variable purity; then "steel sand," "glass sand," lake sand, &c., all coming under the general head of a sand which is refractory to a high degree.

It is impressive to know that the gyratory motion imparted to a rifle bullet by the twist in the barrel may give it a peripheral velocity sufficient to test its cohesive strength. With the United States 0.30 caliber rifle the rifling gives one revolution of the bullet about its axis in 10 inches. At the service muzzle velocity of the bullet, 2300 feet per second, this means 2760 turns per second, assuming that the bullet does not strip in the rifling. The circumference of the bullet is 0.942 inch, which gives a peripheral velocity of 2600 inches per second, or 13,000 feet per minute. This would produce a great strain in cast iron and would rupture a metal of much less tenacity and greater density. This accounts for the steel-coated bullets now so commonly in use.

PERSONAL.

Prof. Charles F. Perry, in charge of the mechanical engineering department of the University of Illinois, has been engaged to take charge of the Milwaukee School of Trades as managing director. Professor Perry will assume his new duties July 1, relieving James S. Church, who consented to take charge of affairs at the opening of the school until a permanent director was chosen.

Frederick W. Taylor, president; Prof. F. R. Hutton and Fred J. Miller are the members of the special committee of the American Society of Mechanical Engineers appointed to suggest a candidate for the secretaryship of the society.

John Hall of Hall & Pickles, wire and steel merchants, Manchester, England, is now in this country.

The friends of H. H. Campbell, metallurgical engineer of the Pennsylvania Steel Company, Steelton, Pa., will be happy to learn that he has just passed through the critical stage of a serious illness and that his physicians are now hopeful of his recovery.

Charles C. Knauss, who has been manager of the Allentown Foundry & Machine Works, Allentown, Pa., since the spring of 1900, has resigned to accept a similar position with the Traylor Mfg. & Construction Company, whose new works for the production of mining, milling, concentrating, reducing and crushing machinery in Allentown are just being completed. The output of these works is controlled by the Traylor Engineering Company, New York.

The friends of General Manager Swank of the American Iron and Steel Association will be gratified to know that he has been making a good recovery from the effects of a recent operation.

Albert P. Low of the Geological Survey of Canada has been appointed director of the Survey. Dr. Robert Bell has been acting director since the death of Dr. Dawson in 1901. Dr. Bell will receive the medal of the Royal Geographical Society in recognition of his work in exploration, King Edward having approved the recommendation of the society.

Geo. W. Kittredge, chief engineer of the Big Four Railroad system, has been appointed head of the engineering department of the New York Central & Hudson River Railroad Company.

W. D. Zehnder, president of the Scranton Bolt & Nut Company, Scranton, Pa., has returned from a sojourn on the Pacific Coast greatly improved in health.

It is announced that Frank H. Buhl of Sharon has taken over the entire holdings of T. Sherman Clark in the Sharon Steel Hoop Company, Sharon, Pa. Mr. Clark has not been actively identified with the company for some time.

The German Wire Rod Syndicate.

The members of the rolled rod syndicate in Germany, with the exception of one firm, the Haspe Iron & Steel Works Company, decided in March to continue their agreement until July 1, 1907. That is the date fixed for the expiration of the agreement under which the German Steel Syndicate is now working. At the close of 1905 it had been decided to dissolve the rolled rod agreement on its termination on March 31, 1906, unless meanwhile the efforts to secure a syndicate in the drawn rod and wire nail trades proved successful. The negotiations with manufacturers of drawn rods failed, the principal reason being that a number of works objected to entering an arrangement only lasting to the middle of 1907, the time of the termination of the general steel syndicate agreement. There were objections to giving private information about the inner workings of a business, in exchange for advantages so short lived. However, the decision to dissolve the rolled rod syndicate in the event of an unfavorable outcome of the drawn rod project was reconsidered. This was done also in spite of some unsatisfactory conditions in the workings of the syndicate. The results in domestic trade had been satisfactory, but on export trade prices realized had been too low in the opinion of some members.

OBITUARY.

JOHN HAMILTON, Bridgeport, Conn., brass founder and manufacturer of plumbers' supplies, died March 28.

S. M. CAMPBELL, vice-president of the Van Brunt Mfg. Company, Horicon, Wis., manufacturer of agricultural implements, died April 3. He was born in Canada in 1835. In 1856 he went to Wisconsin and located in Berlin, where for some years he was engaged in railroad construction work and organized the Berlin Marble & Granite Works. In 1881 he located at Horicon and became identified with Van Brunt & Barber, manufacturers of grain seeding machinery. He was one of the incorporators of the Van Brunt & Wilkins Mfg. Company and its first vice-president, which position he held until the time of his death.

DAVID RICHARDS, one of the founders of the Knoxville Iron Company, died at Knoxville, Tenn., March 31, aged 82 years. He was born in Wales in 1824 and became an ironworker. In 1844, with his brothers Joseph and William he located at Danville, Pa., and secured employment as a puddler in the rolling mills, afterward working at various other points. In 1867 he and his brothers located in Knoxville. He was general manager of the Knoxville Iron Company until advancing age compelled him to retire, but he continued to be a director until his decease. He took a deep interest in public affairs, won oratorical fame as the "Blair County puddler" in the second Lincoln campaign and served a term as a Tennessee State Senator, but his special pleasure was to speak at religious gatherings. He is survived by a widow, one son and five daughters.

EBENEZER S. HULBERT, senior member of the firm of E. S. Hulbert & Co., manufacturer of cutlery, Bernardston, Mass., died on the 17th ult., in the 85th year of his age. In earlier years Mr. Hulbert was a manufacturer of hoes at Waterville and Clayville, N. Y. In 1852 he settled in Bernardston, where at first hoes were manufactured, but later the production of cutlery was taken up.

FREDERICK A. JEWETT, treasurer of the John C. Jewett Mfg. Company, Buffalo, N. Y., died on the 3d inst.

Labor Notes.

On April 7 there was held in the city of Toledo, Ohio, at the Toledo Club, a most enthusiastic meeting of manufacturers in the metal trades, who unanimously adopted a constitution and by-laws in accordance with that of the National Metal Trades Association for the formation of a local branch, which hereafter will be known as the Toledo Branch of the National Metal Trades Association. There were present at this meeting 27 of the largest and most representative manufacturers in the city, seven of whom at this time hold membership in the National Metal Trades Association and ten of whom signified their willingness to become members and sign the necessary documents, the others concluded to take the matter under consideration and will probably join within a week. A. C. Fisher, formerly secretary of the Cincinnati Metal Trades Association, was unanimously elected secretary, and arranged to open a labor bureau the following Monday morning. From present indications this will be one of the strongest local branches which the National Association has.

The Iron Molders' Union has made a demand upon the foundrymen in New York City and vicinity for an increase in wages from $3 to $3.25 a day for molders and from $2.75 to $3 for coremakers. A committee of foundrymen has been appointed to consider the situation. It is reported that the Iron Molders' Union has been organizing the apprentices.

A movement is on foot for the establishment in Newark, N. J., of an employment bureau in the metal trades, to be operated in connection with the bureau of the New York and New Jersey Branch of the National Metal Trades Association.

A New Record in Pig Iron Production.

The March production of pig iron established a new record at 2,165,632 tons for the coke and anthracite furnaces of the country, exceeding the previous record, made in January, 1906, by nearly 100,000 tons. In February, with 28 days, the production was 1,904,032 tons. The Pittsburgh and Chicago districts in particular made gains over their performance in February, and in general the gain made by steel works was in greater proportion than that of merchant furnaces. The latter produced at a weekly rate of 172,368 tons in March, as against 169,318 tons a week in February, an increase of about 3000 tons a week. Stocks of pig iron at Southern furnaces were practically unchanged through the month of March. The weekly capacity of coke and anthracite furnaces active on April 1 was 484,240 tons, as compared with 479,737 tons on March 1.

In the following table is given the production for February, as compared with the records for the preceding four months:

Monthly Pig Iron Production.—Gross Tons.

	November. (30 days)	December. (31 days)	January. (31 days)	February. (28 days)	March. (31 days)
New York	113,098	120,016	119,097	121,484	135,713
New Jersey	23,657	21,548	16,259	18,280	28,840
Lehigh Valley	53,245	57,503	56,215	55,218	62,724
Schuylkill Val.	36,929	41,150	48,674	47,852	54,826
Lower Susquehanna and Lebanon Val.	68,400	65,907	75,214	57,979	69,225
Pittsburgh dis.	466,457	488,346	511,941	454,611	533,100
Shenango Val.	165,876	176,009	177,467	153,551	178,378
West. Penn	106,327	114,559	109,695	105,177	106,338
Md., Va. and Kentucky	84,209	79,749	83,704	75,251	83,031
Wheeling dis.	114,448	120,147	113,611	114,324	126,343
Mahoning Val.	154,363	162,052	162,075	148,508	169,468
Central and North. Ohio	162,763	173,453	162,938	154,298	173,494
Hocking Valley and Hanging Rock	26,924	33,902	34,656	32,514	36,675
Ill.,Mich.,Minn., Wis., Mo. and Col.	267,210	225,947	222,736	197,495	231,815
Alabama	147,299	137,560	141,773	134,792	135,739
Tennessee, No. Carolina and Georgia	22,340	27,870	32,838	32,698	39,923
Totals	2,013,635	2,045,718	2,068,893	1,904,032	2,165,632

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of product month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1904.	1905.	1906.	1905.	1906.
January	502,994	1,129,042	1,358,015	21,002	26,305
February	756,260	1,027,937	1,226,760	22,431	26,988
March	913,412	1,232,255	1,400,395	21,280	23,595
April	974,006	1,222,710	.....	20,038	....
May	927,534	1,287,438	.....	24,732	....
June	788,822	1,149,404	.....	21,761	....
July	694,892	1,114,409	.....	31,220	....
August	747,570	1,186,050	.....	27,461	....
September	936,494	1,262,033	.....	21,645	....
October	971,447	1,370,960	.....	26,799	....
November	962,384	1,334,644	.....	23,776	....
December	1,019,841	1,356,962	.....	29,481	....

Among furnaces blown in in March are one Colorado at Pueblo, Andover and Oxford in New Jersey; one Edgar Thomson, La Follette in Tennessee, and one Swede in the Schuylkill Valley. Among furnaces active on March 1 that were out on April 1 are Pequest in New Jersey (blown in April 8), one Edgar Thomson spiegel, Martin's Ferry in the Wheeling district, Emma at Cleveland, Spring Valley in Wisconsin, No. 3 Ohio at Youngstown (blown in April 5) and Battelle in Alabama. The net loss in active furnaces on April 1, as compared with March 1 was one, the number in blast on April 1 being 299.

The table below gives the active capacity of the furnaces producing coke and anthracite pig iron on April 1 and March 1, in gross tons:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	April 1. Number in blast.	April 1. Capacity per week.	March 1. Number in blast.	March 1. Capacity per week.
New York:					
Buffalo	12	12	26,425	12	26,099
Other New York	10	4	4,316	4	4,270
New Jersey	8	5	6,322	4	5,382
Spiegel	2	1	196	1	182
Pennsylvania:					
Lehigh Valley	27	18	13,762	18	13,797
Spiegel	2	2	396	2	433
Schuylkill Valley	13	12	12,380	11	11,917
Low. Susquehanna	10	5	6,916	5	6,358
Lebanon Valley	10	10	8,316	10	7,518
Spiegel	1	1	399	1	619
Pittsburgh dist.	40	39	117,523	38	109,844
Spiegel	4	3	2,852	4	3,808
Shenango Valley	20	19	41,181	19	38,388
West. Penn	24	18	24,010	18	26,292
Maryland	5	4	7,035	4	6,930
Wheeling dist.	14	13	28,469	14	28,910
Ohio:					
Mahoning Valley	16	15	34,767	16	38,327
Cent. and Northern and Michigan	19	18	39,219	19	40,498
Hocking Valley and Hanging Rock	12	11	8,590	11	8,867
Illinois	19	18	39,109	18	33,244
Spiegel	2	2	1,257	2	1,241
Minnesota	1	1	1,146	1	1,260
Wisconsin	5	4	4,837	5	5,706
Missouri	1	1	994	1	1,003
Colorado	4	3	2,598	3	4,003
Spiegel	1	1	229	0	0
The South:					
Virginia	23	14	10,549	14	10,835
Kentucky	7	2	1,121	2	1,234
Alabama	46	27	30,243	28	33,748
Tennessee	16	15	8,358	14	8,174
Georgia	1	1	725	1	850
North Carolina	1	0	0	0	0
Totals	376	299	484,240	300	479,737

For a series of months the active coke and anthracite capacity fluctuated as follows in gross tons:

	Capacity per week.		Capacity per week.
April 1	484,240	February 1	273,692
March 1	479,737	January 1, 1904	185,636
February 1	482,156	December 1, 1903	244,156
January 1, 1906	463,673	November 1	273,715
December 1, 1905	475,814	October 1	353,142
November 1	460,449	September 1	360,197
October 1	445,468	August 1	353,681
September 1	412,563	July 1	384,825
August 1	410,088	June 1	388,178
July 1	408,617	May 1	373,496
June 1	443,092	April 1	386,215
May 1	452,031	March 1	347,424
April 1	439,564	February 1	335,339
March 1	403,157	January 1, 1903	346,073
February 1	405,792	December 1, 1902	336,617
January 1, 1905	377,879	November 1	330,110
December 1, 1904	357,846	October 1	337,837
November 1	334,249	September 1	328,243
October 1	319,249	August 1	328,745
September 1	291,573	July 1	303,793
August 1	246,092	June 1	337,492
July 1	272,301	May 1	337,627
June 1	336,107	April 1	331,140
May 1	368,244	March 1	316,039
April 1	337,257	February 1	325,440
March 1	308,751	January 1, 1902	291,992

Youngstown Steel Hoop Records.—Some large records for output were made in March at the upper and lower hoop mills of the Carnegie Steel Company, at Youngstown, Ohio, and also at the new hoop mill at Greenville, Pa. The lower mill at Youngstown made in March 11,141 tons of hoops, against 10,005 tons in October of last year, the best previous record. The upper mill made 7004 tons, beating its best previous record by more than 1000 tons. The record of the Greenville plant, before it was burned, for a single month was 2380 tons, while the March record was 4394 tons. F. B. Baugh has been appointed superintendent of the hoop mills at Youngstown, succeeding Milton E. Coombs, recently resigned. Mr. Baugh tendered a dinner to the superintendents and foremen of the two hoop mills at Youngstown as an appreciation of the large records for output made in March.

NEWS OF THE WORKS.

Iron and Steel.

Stack No. 6 of the Lackawanna Steel Company, Buffalo, N. Y., which has been under construction, is expected to blow in April 30.

The Spring Valley Furnace, at Spring Valley, Wis., was blown out March 28.

Pequest Furnace, Buttzville, N. J., was banked in the second week in March for repairs. Blast was put on again on April 8.

Henry A. Hintner's Sons, Philadelphia, Pa., have purchased the Lehigh Mill of the Allentown Rolling Mills, Allentown, Pa., consisting of all the necessary machinery, &c., for the manufacture of plates, angles and shapes. The firm intends dismantling the plant immediately.

Oxford Furnace of the Empire Iron & Steel Company, Catasauqua, Pa., was blown out March 8.

The Rogers-Shear Company, Warren, Pa., is building a rolling mill at Franklin, Pa., which will be operated for it by Edward E. Hughes, receiver of the Franklin Rolling Mill & Foundry Company. The works are being equipped with one continuous heating furnace and one 12 and one 18 inch train of rolls. Special types of high carbon steel bars for the reinforcing of concrete, and rounds, squares and flats will be rolled, for which the plant will have an annual capacity of about 25,000 tons. Natural gas and coal will be used for fuel. The officers of the Rogers-Shear Company are William R. Rogers, president; James P. Rogers, secretary, and David Shear, treasurer.

The Portsmouth Steel Company, Wheeling, W. Va., with open hearth steel plant at Portsmouth, Ohio, is adding a fifth open hearth furnace, giving the company four basic open hearth furnaces and one acid furnace of 50 tons capacity. The new furnace is expected to be ready for operation in May. This company is now arranging to use natural gas as fuel for its entire plant and will entirely abandon coal.

It is officially stated that the new Bessemer steel plant of the Youngstown Sheet & Tube Company of Youngstown, Ohio, will be in operation about August 1. Aside from the sheet bar and billet mills, there will be a 10-inch skelp mill and a three-high plate mill. With one or two additional blast furnaces which are to be built later and the installing of a system for hauling the molten metal from the furnaces to the steel mill the company will have one of the most improved plants of its kind in the country. Other improvements on an extensive scale may be added later, in the way of additional sheet mills and guide mills.

No. 3 Isabella blast furnace of the Carnegie Steel Company at Pittsburgh, which has been idle for more than a year undergoing extensive repairs, will blow in this month. The stack has been entirely rebuilt, is now 85 x 20 feet and has been equipped with the Gayley dry blast air system. The furnace is expected to make from 400 to 450 tons of metal per day.

General Machinery.

The Morgan Engineering Company, Alliance, Ohio, is now building all its own structural work used in construction of its machines, such as girders for electric traveling and gantry cranes and other built up structural material. The company has purchased considerable machinery for doing this work and is putting up a building exclusively for this branch of the business.

The Hyrum A. Silver Foundry & Machine Company, Salt Lake City, Utah, has been incorporated with a capital stock of $150,000. The incorporators of the company several months ago purchased a 7-acre tract, upon which will be erected three buildings for machine shop and foundry purposes, and also for carrying in stock a full line of structural material, such as I-beams, channels, angles, plates, &c. Electric power will be used throughout the plant, and most of the contracts for machinery have been let through the Salt Lake Hardware Company, Salt Lake City. Officers of the company are: Joseph J. Daynes, president; Hyrum A. Silver, vice-president and manager; George Silver, assistant manager, and Seymour B. Robbins, secretary and treasurer, and these, with Arthur Winter, C. L. Olson, Willard T. Cannon, Ernest Rumell and Ed. E. Jenkins, will form the directorate.

The Batavia Engineering Works, Batavia, Ill., has been incorporated with a capital stock of $50,000 by Andrew Benson, J. Aug. Benson, Henry Benson and Albert Benson. The company intends to manufacture and erect all kinds of metal structures and tanks and carry on a general machine shop and foundry business.

The Baird Machine Company, Oakville, Conn., manufacturer of special machinery, foot and power presses and oblique tumbling barrels, is to materially increase its capital stock. It is expected that some time this season the works will be extended moderately, but no definite plans have been made as yet. There will be no change in management. J. H. Baird is the president and C. L. Warner the secretary and treasurer of the company.

The Standard Machine Company, Waterbury, Conn., has been organized to manufacture standard and special machines, metal and wire working machinery. The company has purchased the tools of Cross & Spiers and leased a part of their building at 37 Canal street. The incorporators, who will take active part in the business, are Alexander W. Limont, for the past 20 years an assistant to and master mechanic of the Holmes, Booth & Haydens Company; Andrew Gardner, for 16 years with the Waterbury Farrel Foundry & Machine Company, as foreman of the heavy machine department, and Adam Callan, foreman of the automatic machine department of the Waterbury Machine Company for seven years. The line of machinery will include seamless tube and rod working machinery. The capital stock is $10,000.

The recent fire at one of the plants of the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, was confined to the rivet and bolt department. The company has two plants situated about half a mile apart, one devoted to the manufacture of rivets and bolts and the other to the manufacture of power transmission machinery, such as shafting pulleys, hangers, couplers, friction clutch pulleys, &c. The power transmission department was not affected, and the company is in a position to fill orders for this class of material without delay.

The Thomas Carlin's Sons Company, Allegheny, Pa., reports that its sales for March were the largest in any one month in its history. Its plant at present is very busy turning out shears, steam shovels, hoisting engines, contractors' machinery and grinding pans for all purposes. Shipments of equipment in March were 34 cars and receipts of materials were 29 cars.

The Toledo, Peoria & Western Railroad is badly crowded for room in its shops at Peoria, Ill., and is considering East Peoria as a location for new shops. Nothing definite has been decided, and if the company does settle upon a site in that town the new shops will not be constructed for some time and then only gradually.

The Newburgh Ice Machine & Engine Company, Newburgh, N. Y., has plans prepared for an addition to its plant 60 x 200 feet, which the company intends to erect on a plot 70 x 200 feet. The company has sufficient orders on its books to keep it busy for a long time to come.

The L. C. Roberts Mfg. Company has been incorporated at Fillmore, N. Y., to manufacture concrete mixers, boilers, engines, &c., with a capital stock of $50,000. Incorporators are: J. H. Howden, W. L. Young and W. P. Brooks, Fillmore.

The Star Forge Company has been incorporated at Buffalo, N. Y., to manufacture forges, blowers, ventilators, &c., with a capital stock of $5000. Incorporators are: C. Hamilman, M. A. Hamilman and C. Hamilman, Jr., Buffalo.

The Payne & Joubert Machine & Foundry Company, Birmingham, Ala., recently organized, has purchased 25 acres of land at East Birmingham and is now erecting the necessary buildings to manufacture. The main building is 140 x 400 feet; power house, 50 x 100 feet; office building, 30 x 50 feet. The main building is constructed of steel, with brick veneering and metal roof, and is to be actually fireproof, no insurance being carried. Equipment will embrace two 150 horse-power boilers, one 300 horse-power Corliss engine, two blowers for cupolas and a 200-kw. generator. All machinery and tools have been bought and the works are expected to be put in operation June 15. The president of the company is W. E. Payne; vice-president and general manager, R. L. McKnight, and secretary and treasurer, F. L. Joubert.

Power Plant Equipment.

The Heisler Mfg. Company, St. Marys, Ohio, reports recent orders for two barometric condensers equipped complete with vertical crank and fly wheel dry vacuum pump for Swift & Co., to be installed in their large power plants at St. Joseph and Kansas City, Mo. This type of condenser is rapidly gaining favor with large steam consumers, owing to the simplicity of construction and the fact that all automatic regulating devices are dispensed with. The company also secured the order for the high duty pumping engine to be installed in the Ohio Building, Toledo, Ohio, for elevator service. This will be of its well-known compensating type and similar to the one installed in the W. L. Milner Company's large department store in the same city two years ago, although the new one will have a triple expansion steam end and is designed for higher pressure.

The Scannell Boiler Works, Lowell, Mass., is building an addition to its works, 25 x 56 feet. More light and room for the work will be thus procured. No new machinery will be installed for the present.

The Portland Lighting & Power Company, Portland, Maine, is to establish a new substation in which 800 horse-power will be developed by steam. The contracts for equipment are let.

V. A. Decker, E. C. White and Lewis P. Cooke have purchased the plant of the Hawley Electric Light Company, Hawley, Pa., and have organized the Paupack Electric Company and will rebuild the plant, putting in new and additional water wheels, boilers and generators. F. C. White is president, Lewis P. Cooke vice-president and V. A. Decker secretary and treasurer.

The Rumsey Gas Engine Company, which is to rebuild its plant at Ripley, N. Y., has incorporated as the C. B. Rumsey Engine & Machine Company, with a capital stock of $20,000.

The Amburson Hydraulic Construction Company, Boston, Mass., is building a new concrete steel dam on the Patapsco River, at a point below Ellicott City, Md., where a water power

is being developed. A special feature of the work is that the power house, which is to contain three 500 horse-power units, is to be entirely within and under the raceway, the water passing over the top of the power house.

The Board of Public Works, Bowling Green, Ky., will receive bids until April 26 for a 3,000,000-gallon vertical pumping engine. Proposals may be made on crank and fly wheel, direct acting or compensating types of engines.

Foundries.

The Fort Pitt Steel Casting Company, a corporation recently formed for the manufacture of steel castings, has about completed its new plant at McKeesport, Pa., and expects to be ready for active operations about May 1. The plant will consist of steel constructed fire proof buildings, fitted with modern equipment, including a modified Bessemer converter, Whiting cupalo and Connersville blowers. Motive power will be furnished by two Miller gas engines. An electric crane will also be installed. The plant is located on the main line of the Baltimore & Ohio Railroad and is also within easy hauling distance of the Pittsburgh & Lake Erie Railroad. The officers are: C. S. Koch, president and general manager; William Curry, vice-president, and W. L. Curry, secretary and treasurer.

The Odin Stove Mfg. Company, Erie, Pa., has completed arrangements for the construction of a new foundry in connection with its present plant. The new building will be 55 x 165 feet, with an addition 20 x 42 feet. There will be another building 50 feet square.

The Alloys Founding Company has been incorporated at Buffalo with a capital stock of $12,000. The directors are Geo. M. Trefts, Jr., of Farrar & Trefts, manufacturers of engines and boilers; Herman Seelbach, Buffalo, and Seward H. Millener, Tonawanda. The company will manufacture metal compounds and conduct a general foundry and machine business. A building has been secured for foundry and machine shop on Mississippi street, and will be fitted up to commence operations about May 1. Herman Seelbach is to be manager of the new company.

The new company which was formed by J. M. Herbert and others of Denver, Col., and which is to establish a large foundry, as noted in these columns a week or so ago, has incorporated as the Colorado Gray Iron Foundry Company, with a capital stock of $100,000. J. M. Herbert is president and J. T. Ritchie secretary.

Bridges and Buildings.

The St. Paul Foundry Company, St. Paul, Minn., is building an addition to its structural steel shop, which will be 80 x 115 feet. The building is being equipped with new tools and machinery, all of which has been purchased.

The Des Moines Bridge & Iron Works, Des Moines, Iowa, has been awarded contract for the steel construction work on the R. A. Long office building at Kansas City, the contract price being $126,000. The company has also been awarded contract for the structural steel work on the Shubert Theater, Kansas City, amounting to $50,000.

The Richard Iron Works, Birmingham, Ala., has added a structural steel department, the intention being to have the largest regular stock in the Birmingham district of beams, angles, channels, &c.

The American Bridge Company is fabricating a large tonnage of structural steel at its plant at Ambridge, Pa., for shipment to Korea, Japan. It is said the contract amounts to nearly 30,000 tons and was secured by the United States Steel Products Export Company. The first lot of material is expected to be shipped this month.

Fires.

The rolling mill of the Republic Iron & Steel Company, at Moline, Ill., was damaged $100,000 by fire on April 6.

The machine shops of the Georgetown & Western Railroad, at Rosemary, near Georgetown, N. C., were destroyed by fire last week. The loss is placed at $40,000.

The mill of the Androscoggin Pulp Company, at Brunswick, Me., was burned April 6, with a loss of about $50,000.

On April 4 the buggy and wagon factory of R. D. Scott & Co., Pontiac, Mich., was burned. The loss is estimated at $100,000.

Hardware.

The White Lily Washer Company, Davenport, Iowa, has had plans prepared for a large addition to its plant in West Davenport, to be built in the near future. The addition will be in corresponding hight with the present building and will be almost half as large again as the plant now in operation. This addition will be devoted to the manufacturing department, and a greater portion of the present east wing will be used as a shipping department. The company has completed arrangements with the Chicago, Milwaukee & St. Paul Railroad whereby another side track will be built to the plant.

The Lennox Machine Company, Marshalltown, Iowa, will enlarge its factory by the erection of a two-story building, 80 x 100 feet. A scale department has just been added for the manufacture of a ball-bearing pitless scale. The company recently placed an order for an engine lathe with the O. L. Packard Machinery Company, Milwaukee, Wis.

The Phœnix Wire Works, Detroit, has let contract to the S. B. Cole Company, Traverse City, Mich., for the erection of a two-story factory, 152 x 153 feet. Construction will begin immediately on the building.

The Taylor Mfg. Company, Hartford, Conn., has been incorporated in Connecticut to manufacture tools, novelties and advertising specialties. The capital stock is $50,000, and the incorporators are Charles G. Taylor, T. A. Stewart and C. O. Blomquist. The company manufactures a burglar proof door securer, a double end lathe and planer tool, a ventilating window fastener and combination key ring, key tag, cigar cutter and pocket screw driver.

The National Mfg. Company, Worcester, Mass., manufacturer of wire goods, is to erect a new building as an addition to its works, to be 65 x 100 feet, five stories and basement. The chief purpose of the new structure is to secure additional storage facilities, though a portion of the new space may be devoted to manufacturing. The present storerooms of the company will be utilized for manufacturing, giving considerable increase in output, which has been made necessary by the growth of business during the past year or two. The building will be served by a spur track from the Boston & Maine Railroad, and will be connected with the present buildings on the other side of the tracks by a bridge and tunnel.

W. H. Weston, Lakeport, N. H., has leased the old box shop in that town and will establish a factory for the manufacture of a patent adjustable wrench and other light mechanical devices.

The Hotchkiss Bros. Company, Torrington, Conn., wholesale building materials, has arranged with the new Hotchkiss Foundry Company to handle its entire output of sash weights, which is the foundry company's only product.

The Crescent Firearms Company, Norwich, Conn., manufacturer of shotguns, has increased its capital stock from $74,000 to $100,000.

The American Bolt Company, Birmingham, Ala., has just introduced the use of fuel oil in lieu of coke for heating bolts in the company's forge shop.

Clipper Lawn Mower Company, Dixon, Ill., is just completing a new factory building, 40 x 150 feet, three stories high. It is built of concrete rock face blocks. This addition to the company's former plant will enable it to take care of the largely increased demand for the company's lawn mowers. The company will also make this season marine gasoline engines, 2 to 8 horse-power.

Valley Forge Cutlery Company, 28-42 South Sixth street, Newark, N. J., manufacturer of pocket cutlery, is building an addition to its plant which will more than double its capacity. The enlargement was necessary in order to take care of the company's increased business.

Miscellaneous.

The Pope Mfg. Company, Hartford, Conn., is to erect a new factory building as an addition to its Hartford works. The building will be of brick and steel construction, 54 x 83 feet.

The Union school district, Concord, N. H., has voted to appropriate $30,000 for the erection and equipment of a manual training school in that city.

The Submarine Signal Company, 247 Atlantic avenue, Boston, is contemplating the erection of a new factory building, the location of which is not determined. The present factory on Atlantic avenue has been outgrown, because of the demand for the company's product. Recent orders include one from the North German Lloyd Steamship Company for submarine signal apparatus for eight of the company's large steamships. The company already has considerable machine equipment in its works, and when the new building is ready for occupancy this will be moved and new machinery purchased as it is required. Funds for the extension of business will be provided from a new issue of stock.

The Chamber of Commerce, New Castle, Pa., is endeavoring to secure the location in that city of an iron bedstead manufacturing company, to have a capital stock of $500,000 and to employ about 200 men. It is also working to get a forging plant.

The Buffalo Car Journal Box Company, Buffalo, N. Y., recently incorporated, intends to establish a plant at Buffalo, N. Y., plans for which have not been completed. Irving L. Fisk, Morgan Building, Buffalo, is interested.

The Commercial Truck Company, Arcade Building, Philadelphia, Pa., was recently incorporated with a capital stock of $1,200,000, to manufacture electric, steam and gas vehicles. The company is operating an extensive plant at Altoona, Pa., adjoining the main yards of the Pennsylvania Railroad, for the rebuilding of locomotives and the manufacture of steam shovels and railroad grading machinery. That department of the company's business is filled with orders. In addition to the buildings the company owns 149 acres of ground upon which it will erect another structure of steel and concrete to cover an area of 75,000 to 100,000 square feet. This new building will be used for the manufacture of auto trucks and wagons under the patents known as the Imperial electric four-motor drive. The officers of the company are H. F. Kerbaugh, president; Charles Berg, vice-president and general manager; Frank Brown, secretary and treasurer, who, with Russell Thayer and James O. G. Duffy, constitute the Board of Directors.

The Atlas Specialty Company has been incorporated at Buffalo to manufacture aluminum and bronzes, also patented

specialties. The capital stock is $10,000. Incorporators are: Solomon Nathan, James F. Miller and Sidney J. Shulman, Buffalo.

It is stated that the terms for the sale of the Pittsburgh Stove & Range Company to the Stove & Range Company, which is to be acted upon at a special meeting of the stockholders of the former on April 23, contemplates the reduction of its capital stock by just one-half. The new company will have a capital of $1,000,000, half stock and half 5 per cent. bonds. For the common stock of the old company one share of the new will be offered for each two shares now held, and for 40 shares of the preferred stock will be offered a $1000 bond, which practically places the old preferred on a basis of $25 a share. The new company will have only common stock.

The Franklin Car Heating Company has been incorporated at Syracuse, N. Y., to manufacture car heaters, railway supplies, &c. Capital stock is $20,000. Incorporators are G. H. Brown, W. L. Brown, Syracuse, N. Y., and K. D. Hequembourg, Franklin, Pa.

In March the Pressed Steel Car Company, Pittsburgh, Pa., turned out at its two steel car plants in that city over 4000 steel cars. This company is reported to have enough orders on its books to take its entire output of steel and steel frame cars practically up to the close of the year.

At the annual meeting of the General Railway Signal Company, held in Rochester, N. Y., April 5, W. W. Salmon of Buffalo was elected president; Geo. D. Morgan, Buffalo, vice-president and treasurer, and Hardin H. Little, Buffalo, secretary. It was decided to order additional machinery for increasing the facilities of both the Buffalo and Rochester plants.

The August Schubert Gear Company, Oneida, N. Y., recently incorporated, is building a new plant on the line of the New York Central Railroad for the manufacture of gears for vehicles and other wagon and carriage trimmings. August Schubert is president and treasurer; J. A. Schubert, vice-president, and Z. Frederick White, secretary and assistant treasurer.

The Willock Mfg. Company, Times Building, New York, capitalized at $50,000, is manufacturing a portable gas attachment for coal stoves. The officers are: Frederick J. Willock, president; Hayden Talbot, vice-president; John Niclaus, Jr., secretary and treasurer.

The Northern Ore Company, Pelham Manor, N. Y., has organized, with a capital stock of $50,000, to mine and smelt ores. L. W. Francis is interested.

The American Fire Proofing Company, Pittsburgh, has voted a bond issue of $2,500,000. New directors were elected last week, as follows: T. Hart Given, Hay Walker, Jr., W. A. Stone, J. B. Findley.

The Kent Overdraft Furnace Company has been incorporated at Buffalo, N. Y., with a capital of $150,000, to manufacture the Kent patent overdraft furnace. Directors are H. Ginnane, E. M. Waltz and M. F. Kimball, Buffalo.

American Engineers in Great Britain.—A meeting, attended by about 25 members of the Iron and Steel Institute, was held in London March 22 to make arrangements for the meeting of the institute in July, which will be attended by representatives of American engineering societies. It was stated that about 200 visitors from the United States would make the trip. The party is expected to arrive in London on Monday, July 23. Mr. Carnegie has written that he will be present. The mornings of Tuesday, July 24, and Wednesday and Thursday will be taken up with the reading and discussion of papers. In the afternoons visits will be made to places of interest. On July 24 the Lord Mayor of London will entertain the institute at the Mansion House. Another entertainment is provided for July 25 and 26. The institute dinner will be held on July 27 and on the afternoon of that day a visit will probably be made to Windsor. On Saturday, July 28, the visitors have been invited to see the manufacture of tunnel segments as cast direct from the blast furnace at the works of Butlin & Co. of Wellingborough. This process was described in *The Iron Age* of January 12, 1905. On Monday, July 30, the American visitors leave for Middlesbrough, Newcastle and Edinburgh, and from the last named place those who elect to make the Continental trip go to Düsseldorf for the meeting with German engineers.

The winter wheat crop, according to the Government report of conditions on April 1, promises a yield of about 473,000,000 bushels, against an estimated yield of 480,000,000 bushels at the corresponding date last year. As the 1905 crop was 428,462,834 bushels it will be seen that there is room for quite heavy deterioration in the growing crop to get down to those figures, which were considered very satisfactory. Nevertheless the report falls much below expectations, as the belief had been general that wheat had come through the winter in almost ideal condition.

Federal Regulation of Small Power Boats.

WASHINGTON, D. C., April 9, 1906.—The attention of manufacturers of gasoline engines, electric motors, launches and small power boats under 15 tons has recently been drawn to a bill which passed the Senate a few days ago and has now been reported from the House Committee on the Merchant Marine and Fisheries with a favorable recommendation. It is intended as a substitute for a measure introduced in the last Congress but abandoned because of the protests of manufacturers against its drastic provisions. The original bill required that all power boats under 15 tons should carry licensed engineers and pilots, thereby bringing these small craft under the general regulations of the Steamboat Inspection Service.

The original bill was introduced for a very laudable purpose—namely, to provide against accidents, which the friends of the measure declared had frequently occurred to these small boats when in the hands of inexperienced or incompetent persons. The manufacturers of motors, engines and launches conceded that it was desirable to prevent accidents, but they asserted that the small boats covered by the bill were far safer than was commonly believed and that accidents were so rare as not to justify the proposed legislation. It was pointed out also that a requirement that a very small launch or motor boat should carry a pilot and engineer would be absolutely prohibitory. After an extended hearing granted to the manufacturers of engines and builders of small boats the original bill was indefinitely postponed.

Provisions of New Bill.

The Steamboat Inspection Service, recognizing the futility of an attempt to impose such restrictions upon the operation of these small boats as were embodied in the original bill, recently drafted a much less drastic measure. This bill adds to section 4426, Revised Statutes, the following:

All vessels of 15 gross tons or less, propelled in whole or in part by gas, gasoline, petroleum, naphtha, fluid or electricity, and carrying passengers for hire, shall carry one life preserver, of the sort prescribed by the regulations of the Board of Supervising Inspectors, for every passenger carried, and no such boat while so carrying passengers shall be operated or navigated except in charge of a person duly licensed for such service by the local board of inspectors. No examination shall be required as a condition of the obtaining of such a license, and any such license shall be revoked or suspended by the local board of inspectors for misconduct, gross negligence, recklessness in navigation, intemperance or violation of law on the part of the holder, and if revoked the person holding such license shall be incapable of obtaining another such license for one year from the date of revocation.

In urging the enactment of this measure Secretary Metcalf of the Department of Commerce and Labor, in a communication to the House and Senate, said:

The aim of this provision is merely to give the local inspectors some hold on the persons operating such boats, so that in case of misconduct, &c., such licenses can be suspended or revoked. Under the present law these boats and their navigators are wholly irresponsible, and numerous accidents have arisen from such fact. It is obvious, also, from many letters of complaint, that these boats, being required to carry no special equipment and being subject to no restrictions, enter into very unfair commercial competition with small steam vessels that are subject to all the requirements of the steamboat inspection law, and a substantial premium is thus placed upon a form of traffic providing none of the usual safeguards for the lives of the passengers carried.

Will Probably Pass.

The Senate Committee on Commerce, acting upon the recommendation of Secretary Metcalf, promptly reported the bill, and it passed the Senate a few days ago. The House Committee on the Merchant Marine and Fisheries took the bill up without delay and after brief consideration has reported it favorably. It will probably pass the House at an early date. Manufacturers who strenuously opposed the original bill are disposed to favor this measure, especially as it will end the agitation that has been kept up for the past three years, largely by labor organizations desiring to widen the field for the employment of licensed engineers and pilots. W. L. C.

The Iron and Metal Trades

The monthly Pig Iron statistics collected by *The Iron Age* show that March has been a record breaker in the matter of production of Iron. The make, exclusive of Charcoal Iron, amounted to 2,165,632 gross tons, as compared with the best previous month, 2,068,893 tons, in January. Estimating the Charcoal Iron product, we reach a total of close to 2,200,000 tons in one month.

The Steel companies in March made 1,400,395 tons, while the merchant furnaces produced 765,237 tons. That this enormous amount of metal has gone into consumption is shown by the fact that the stock of the Steel Corporation is down to the lowest figure in its history, 110,000 tons; that some of the other Steel companies have only recently bought outside metal, or are in the market now. So far as the merchant furnaces are concerned, returns from the furnaces in Virginia, Alabama, Tennessee and Georgia show that their stocks aggregated 102,353 tons on March 1 and 101,375 tons on April 1.

Active furnace capacity increased from 479,737 tons per week on March 1 to 484,240 tons on April 1.

There has been a good deal of heavy buying during the past week, the majority of the large transactions, however, having been made at concessions. These appear to have cleaned out what speculative Iron there was and to have stiffened the backbone of many of the principal sellers. It is only just to state, however, that old prices have cropped up during the last day or two.

The Cast Iron Pipe interests, which have enjoyed the best month in the history of the industry during March, have been large purchasers. They have taken from 60,000 tons to 75,000 tons of Pig Iron, the greater part in the South, although the furnaces in the East and in the Central West have come in for their share.

The total quantity called for by the Westinghouse Company has not been placed, but Buffalo, Cleveland and the South participated in the business. Reports that particularly low prices were made are denied.

In St. Louis one lot of 11,500 tons of Iron was placed and a radiator company bought 5000 tons in Chicago.

The Steel Corporation bought 18,000 tons of Bessemer Iron, for shipment to Cleveland and Chicago, and picked up also a 2000-ton lot of Basic Pig. The Cambria Company took 10,000 tons and another interest is in the market for about 20,000 tons. In eastern Pennsylvania the buying of Basic Pig has started, 10,000 tons being taken to-day at $17.90 to $18, delivered at Steel works.

The Lake Superior Corporation has secured the second 50,000 tons of Steel Rails for the Grand Trunk Pacific, the American mills having been unable to touch the business. The Hill interest is now negotiating with Canadian mills for tonnage for the new lines in Canada. Among the domestic Rail orders placed are 12,500 tons for the Atlanta & West Point, 11,000 tons for the Northern Electric and 5000 tons additional for the Great Northern. A transcontinental road has practically closed for 25,000 tons. A moderate sized order for Japan has also been closed. Inquiries are at hand for deliveries for 1907, but the mills are not booking orders yet.

There has been a good deal of activity in Structural Material, among the contracts placed being 6300 tons for St. Louis, 4800 tons for Los Angeles, 3300 tons for Chicago, 2400 tons for New Orleans and 6000 tons for the power house of the Hudson Company.

Among the bridge orders are 7000 tons for the Lehigh Valley and 5500 tons for the Cincinnati, New Orleans & Texas Pacific. The Manhattan Bridge, for which bids are to go in, calls for 42,000 net tons of material.

Some good orders have been placed for Merchant Pipe. Among them is one for 232 miles of Line Pipe for a new Kansas enterprise.

On account of the phenomenal rise in the price of Tin, the makers of Tin Plate have advanced their prices from the $3.50 base, Pittsburgh, per box, to $3.60.

March was a record breaker so far as shipments were concerned for the United States Steel Corporation. The shipments of material to customers aggregated 998,000 tons.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Apr.11, 1906.	Apr.4, 1906.	Mar.14, 1906.	Apr.12, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$18.50**	$18.25	$18.25	$17.50
Foundry No. 2 Southern, Cincinnati	16.50	16.50	16.50	16.25
Foundry No. 2, Local, Chicago	*18.75*	18.75	19.00	17.25
Bessemer, Pittsburgh	*18.10*	18.20	18.35	16.35
Gray Forge, Pittsburgh	*16.60*	16.60	17.00	16.00
Lake Superior Charcoal, Chicago	*19.50*	19.50	19.75	18.50
BILLETS, RAILS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	**27.00**	27.00	26.50	24.00
Forging Billets, Pittsburgh	32.00	32.00	32.00	27.00
Open Hearth Billets, Phila	*29.00*	29.00	29.50	28.00
Wire Rods, Pittsburgh	34.00	34.00	34.00	34.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago	13.50	13.50	13.50	15.25
O. Steel Rails, Philadelphia	**17.00**	17.00	16.25	18.00
O. Iron Rails, Chicago	20.50	20.50	20.50	20.00
O. Iron Rails, Philadelphia	**21.50**	21.50	20.50	25.00
O. Car Wheels, Chicago	19.00	18.00	19.00	16.00
O. Car Wheels, Philadelphia	*16.75*	16.75	18.00	17.00
Heavy Steel Scrap, Pittsburgh	*14.50*	14.50	14.75	16.25
Heavy Steel Scrap, Chicago	**13.50**	13.50	12.50	14.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	*1.63½*	1.73½	1.73½	1.73½
Common Iron Bars, Chicago	*1.66½*	1.71½	1.70	1.60
Common Iron Bars, Pittsburgh	*1.60*	1.60	1.70	1.65
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Beams, Pittsburgh	1.70	1.70	1.70	1.60
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Angles, Pittsburgh	1.70	1.70	1.70	1.60
Skelp, Grooved Steel, Pittsburgh	1.57½	1.57½	1.57½	1.65
Skelp, Sheared Steel, Pittsburgh	1.60	1.60	1.60	1.70
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	*2.25*	2.25	2.30	2.30
Wire Nails, Pittsburgh	1.85	1.85	1.85	1.80
Cut Nails, Pittsburgh	1.80	1.80	1.80	1.80
Barb Wire, Galv., Pittsburgh	2.30	2.30	2.30	2.25
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Copper, New York	18.62½	18.62½	18.62½	15.25
Spelter, St. Louis	*5.90*	6.00	6.15	5.80
Lead, New York	5.35	5.35	5.35	4.50
Lead, St. Louis	*5.25*	5.25	5.27½	4.47½
Tin, New York	**38.55**	38.25	36.50	30.95
Antimony, Hallett, New York	**19.50**	18.00	16.00	8.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	**$3.79**	$3.69	$3.69	$3.74

Chicago.

FISHER BUILDING, April 11, 1906.—(*By Telegraph.*)

Heavy buying by Pipe and Foundry interests has resulted in a sharp reaction of the Pig Iron market and the practical withdrawal of the $13.75 basis for Southern No. 2 for second and third quarter delivery. The United States Cast Iron Pipe & Foundry Company purchased approximately 40,000 tons for shipment to its various plants from different Southern interests. Purchases of Western foundries easily aggregate 15,000 tons for the week, made up largely of lots ranging from 500 to 1500 tons, and the International Harvester Company is expected in the market shortly for a large tonnage for second half requirements. At a meeting of the Malleable manufacturers held here yesterday, prices for Castings for the implement makers for delivery during the ensuing year were considered and the placing of this tonnage will result in the buying of a large tonnage of Malleable Pig Iron to cover these contracts. This revival of Pig Iron demand has resulted in an entire reversal of sentiment, affecting not only raw material but finished lines as well. The Implement interests will place large contracts for Steel Bars this week, unless negotiations now under way fail entirely, and quotations on Merchant Shapes will be named this trade within ten days on material for delivery the ensuing year. As the present season for the Implement makers is fast coming to a close, their specifications for all kinds of material are not as heavy as earlier in the year, but shipments are still deferred from 30 to 60 days. Large distributing interests are exceedingly active in booking direct mill shipments of Plates, Bars and Shapes despite the removal of the differential on July 11, and the adjustment of the latter in the next two months would not at all surprise the trade. Iron Bars have been reduced to

1.50c., Pittsburgh, by Western manufacturers, but as yet little tonnage has been booked on this basis. The report that the East St. Louis mill of the Republic Iron & Steel Company has been shut down on account of a shortage of coal has been officially denied. Inquiries for Rails for second and third quarter delivery from the smaller Western and Northwestern roads are numerous and include one lot of 7000 tons. In the Northwest the season for the Nail and Wire trade is just opening and heavy shipments will be made from Cleveland as soon as lake traffic begins. On account of the small stocks in this section deliverics are already being hurried by rail at an increased freight rate of $2 a ton to help out the distributers until lake shipments can be made. Contracts for the Steel for three large buildings in the South and West, aggregating 13,500 tons, have been awarded as follows: Syndicate Annex, St. Louis, 6300 tons to the Jones & Laughlin Steel Company; Hamburger Building, Los Angeles, 4800 tons, to Milliken Bros., and the Gruenwald Building, New Orleans, 2400 tons to the American Bridge Company. Bids are now being asked for the Maison Blanche at New Orleans, 3000 tons, and the Augusta Building, St. Louis, 1400 tons.

Pig Iron.—The deadlock that has existed in the Iron market since the first of the year has been broken by the Western foundry interests that have purchased heavily for future requirements. Sales of both Northern and Southern Iron in lots ranging from 500 to 1500 tons for second and third quarter delivery have been numerous and the quotation of $13.75, Birmingham, for No. 2 has been withdrawn by most of the Southern interests. For third quarter delivery Northern furnaces are asking $19, Chicago, equivalent to $18.50 to $18.75, furnace. The United States Cast Iron Pipe & Foundry Company purchased approximately 40,000 tons for second and third quarter requirements at prices ranging from $13.75 to $14, Birmingham, for No. 2, distributed as follows: Republic Iron & Steel Company, 13,000 tons; Woodward Iron Company, 14,000 tons; Tennessee Coal, Iron & Railroad Company, 12,000 tons. Heavy shipments on these contracts are to be made in the next two months and stocks accumulated at these Southern works will consequently be greatly reduced. As soon as this buying movement set in the Republic Iron & Steel Company and the Tennessee Coal, Iron & Railroad Company announced a reduction in quotations of 50c. a ton—namely, from $14.50, the nominal basis, to $14. A large number of inquiries has been made this week by Iron merchants and slightly higher prices are anticipated. Several of the Western independent Steel interests have under consideration the purchase of Basic Iron for the third quarter, but as yet no contracts have been placed. The Illinois Steel Company has blown in furnace No. 9 at the South Works and all of its operative stacks are now producing. The new furnace at South Chicago will be blown in early in May. Prevailing quotations, f.o.b. Chicago, are as follows:

Lake Superior Charcoal	$19.50 to $19.75
Northern Coke Foundry, No. 1	19.25 to 19.50
Northern Coke Foundry, No. 2	18.75 to 19.00
Northern Coke Foundry, No. 3	18.25 to 18.50
Northern Scotch, No. 1	19.80 to 20.00
Ohio Strong Softeners, No. 1	19.80 to 20.05
Ohio Strong Softeners, No. 2	19.30 to 19.55
Southern Coke, No. 1	18.25 to 18.40
Southern Coke, No. 2	17.65 to 17.90
Southern Coke, No. 3	17.15 to 17.40
Southern Coke, No. 4	16.65 to 16.90
Southern Coke, No. 1 Soft	18.15 to 18.40
Southern Coke, No. 2 Soft	17.65 to 17.90
Southern Gray Forge and Mottled	16.15 to 16.40
Malleable Bessemer	19.00 to 19.25
Standard Bessemer	19.30 to 19.55
Jackson Co. and Kentucky Silvery, 6 %	20.30
Jackson Co. and Kentucky Silvery, 8 %	20.30 to 23.30
Jackson Co. and Kentucky Silvery, 10 %	25.30

Metals.—With the heavy business transacted in Copper during March and a continued heavy demand, prices have slightly advanced during the week. The low stocks of Pig Tin and speculation have also sent Pig Tin up about 1c. Spelter is slightly weaker, but is not expected to stay so. We quote: Casting Copper, 18⅜c. to 18⅝c.; Lake, 18⅝c. to 18⅞c., in car lots; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 39¾c. to 40¼c.; small lots, 40¼c. to 40¾c.; Spelter, prompt delivery, 6.20c. to 6.35c., for car lots; Lead, Desilverized, 5.45c. to 5.70c. for 50-ton lots; Corroding, 6c. to 6.25c. for 50-ton lots; on car lots, 2¼c. per 100 lbs. higher; Sheet Zinc is $7.75 list, f.o.b. Laselle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 16c.; Heavy Copper, 15¾c.; Copper Bottoms, 15c.; Copper Clips, 15½c.; Red Brass, 15¼c.; Red Brass Borings, 13c.; Yellow Brass, Heavy, 12c.; Yellow Brass Borings, 10c.; Light Brass, 8¾c.; Lead Pipe, 4¾c.; Tea Lead, 4½c.; Zinc, 4½c.; Pewter, No. 1, 24c.; Tin Foil, 29c.; Block Tin Pipe, 27½c.

(By Mail.)

Billets and Rods.—The demand for Forging Billets for prompt delivery continues insistent, but is not being met, as all of the large producers have withdrawn from the market and will only quote on second half delivery. As high as $36 to $37 a ton has been offered, but no sales have been recorded. Basic and Bessemer Rods are held at $34, Pittsburgh, equivalent to $37, f.o.b. Chicago. Practically no new tonnage is being booked on this basis, as most of the mills placed contracts last fall at low prices.

Rails and Track Supplies.—Small roads throughout the West and Northwest continue to make inquiries for Rails for delivery during the next three or four months. One road has asked for 7000 tons, while several inquiries are for lots ranging from 1000 to 3000 tons. The tonnage of Standard Section Rails booked last week was comparatively light, as all of the important roads have already placed their contracts. Some of the larger Western roads have made tentative inquiry for deliveries during 1907, but as yet no quotations have been made by the mills and orders will not be booked. Notwithstanding the advance on Light Rails made by the Pittsburgh mills, no change in prices has been noted in local quotations. No new business is being placed, as all of the mines throughout the State of Illinois are shut down at the present time, although mills are comfortably fixed as to future deliveries. Spikes for prompt delivery continue to advance and now held at prices ranging from 2.20c. to 2.25c., although for second half delivery 2.05c. to 2.10c. is quoted. Quotations are unchanged, as follows: Angl Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.15c. to 2.25c.; Track Bolts, 2.65c. to 2.75c., base, Square Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 to 45 lb. sections, $27 to $28; 25-lb., $29; 20-lb., $29 to $30; 16-lb., $30 to $31; 12-lb., $31 to $32, and lighter sections down to 8-lb., $38 to $40, f.o.b. mill. Standard Sections are unchanged, at $28, f.o.b. mill, full freight to destination.

Structural Material.—The cities of Joliet and Peoria, Ill., have voted in favor of track elevation, and a considerable tonnage of Steel will be required in the erection of viaducts over street crossings. The contract for 3300 tons of Steel, to be used in the erection of extensions to the plant of the Western Electric Company, this city, was awarded to the Noelke-Richards Company, Indianapolis. Specifications on existing contracts are being received by the mills freely, and deliveries continue from two to three months behind. For material for prompt delivery the demand continues fair, and quotations are uniformly on the basis of 2.25c. Mill quotations remain unchanged, as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.86½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.86½c.; Angles, larger than 6 inches on one or both legs, 1.96½c.; Beams, larger than 15 inches, 1.96½c.; Zees, 3 inches and over, 1.86½c.; Tees, 3 inches and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work.

Plates.—Consumers continue to specify freely, although little new tonnage is being booked. Western mills now have orders on their books for their output during the next two or three weeks, which is an improvement on conditions that prevailed some time ago. Quotations are held firmly as follows: Tank quality, ¼-inch and heavier, wider than 6¼ and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and heavier, up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16 inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange and Head quality, 25c. extra.

Sheets.—Speculative lots of both Black and Galvanized Sheets that were offered in this market at concessions of about $2 a ton have been largely disposed of, and the market generally is on a firmer basis than it has been during the past month. On the lighter gauges, however, some of the independent mills are making concessions of from $1 to $2, although galvanized sheets are exceedingly firm, at unchanged prices. We make the following quotations: Blue Annealed, Nos. 9 and 10, 1.86½c. to 1.91½c.; Nos. 16 and 17, 2.06½c. to 2.11½c.; Box Annealed, Nos. 18 to 20, 2.26½c. to 2.31½c.; No. 27, 2.46½c. to 2.51½c.; No. 28, 2.56½c. to 2.61½c.; Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 17 to 21, 2.86½c.; Nos. 22 to 24, 3.01½c.; Nos. 25 and 26, 3.21½c.; No. 27, 3.41½c.; No. 28, 3.61½c.; No. 30, 4.11½c. Sheets from store: Blue Annealed, Nos. 10 and 11, 2.10c. to 2.20c.; Nos. 12 and 13, 2.15c. to 2.25c.; Nos. 14 and 15, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c. Box Annealed, Nos. 18 to 20, 2.50c. to 2.55c.; Nos. 22 to 24, 2.55c. to 2.60c.; No. 26, 2.60c. to 2.65c.; No. 27, 2.65c. to 2.70c.; No. 28, 2.75c. to 2.80c.; No. 30, 3.15c. to 3.20c. Galvanized from store: Nos. 10 to 20, 3c. to 3.05c.; Nos. 22 to 24, 3.15c. to 3.20c.; No. 26, 3.35c. to 3.40c.; No. 27, 3.55c. to 3.60c.; No. 28, 3.75c to 3.80c.; No. 30, 4.95c. to 5c.

Bars.—Negotiations are now under way that will probably result in the closing of the entire implement tonnage of the West before the end of the week. Arrangements satisfactory to these manufacturers have been made by the mills and the deadlock that existed will in all probability be broken. Western Bar Iron manufacturers have reduced prices to the basis of 1.50c., Pittsburgh, or 1.66½c., Chicago, on shipments of all sizes. This reduction, amounting to $1 a ton, has thus far resulted in little new business, although the closing of a

large tonnage of Steel Bars will probably result in the placing of future business with the Iron mills. The report that the East St. Louis plant of the Republic Iron & Steel Company has closed, on account of a shortage of coal, has been officially denied. This mill was only closed for a few days last week and is again operating in full. On account of a slight misunderstanding over the interpretation of the Amalgamated scale, one of the mills at the East Chicago works of this company has been shut down temporarily. We revise quotations, as follows: Iron Bars, 1.66½c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—The demand for Merchant Pipe is improving and large contracts are being placed by jobbers in the Northwest for shipment of material as soon as the navigation season opens. Mill quotations are unchanged, on the basis of 81 per cent. off the list, Pittsburgh, although official discounts on car lots, Chicago, remain as follows: Black Steel Pipe, 78.35 per cent. on the base sizes ¾ to 6 inches, and Galvanized, 68.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 inches.

Boiler Tubes.—Specifications are now coming forward more freely from jobbers and small manufacturers. The season for the job shops is just about opening and they are specifying freely to cover their future requirements. Quotations are being better maintained than for some time and with the increased consumption concessions will be heard of less frequently. Official discounts, base sizes, in car lots, are as follows: Steel Tubes, 62.35; Iron, 51.35; Seamless, 50.35; 2½-inch and smaller and lengths over 18 feet, and 2½-inch and lengths over 22 feet, 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1¼ inches	40	35	42½
1¾ to 2¼ inches	50	35	35
2½ inches	52½	35	30
2¾ to 3 inches	60	47½	42½
6 inches and larger	50	35	..

Merchant Steel.—Manufacturers of Agricultural Shapes that come under this classification will probably announce quotations within the next week or ten days on the requirements of implement manufacturers during the next year. In view of the impending Steel Bar situation, these manufacturers have not seen fit to name prices, but as soon as the latter is adjusted the contracts for this tonnage will undoubtedly be placed. Quotations are unchanged, as follows: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish up to 1½ x ½ inch, 1.65c., and Iron Finish, 1½ x ½ inch and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 inch, 2c., and 1⅛ inch and larger, 1.90c., Pittsburgh; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount on car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—No contracts of importance were placed by either gas companies or municipalities during the past week. All of the Pipe works have a large tonnage of the smaller sizes on their books, but there is a dearth of the large sections and none of the Western cities has under consideration the placing of contracts of any importance in these sizes. Quotations are unchanged, as follows: Water Pipe, 4-inch, $31; 6, 8, 10 and 12 inch, $30; over 12-inch, $29, with $1 extra for Gas Pipe. Large municipal contracts are usually placed at somewhat lower basis.

Coke.—Western foundries have been buying freely during the week at slightly advanced prices and many contracts running through the second quarter have been made. This is no doubt due to their anxiety to cover their fuel supply on account of the Coal strike, which has not yet affected and will not affect the Coke production in the Connellsville and West Virginia fields. High grade Connellsville Foundry Coke is now selling on a basis of $3.15 to $3.25 at the ovens and By-Product Coke is quoted at $5.80, Chicago.

Old Material.—Railroad lists aggregating approximately 15,000 tons have been issued by the Chicago, Milwaukee & St. Paul, the Baltimore & Ohio, Illinois Central, Atchison, Topeka & Santa Fé, Wisconsin Central and the Chicago, Rock Island & Pacific railroads during the past week. The list of Old Material to be disposed of by the Illinois Central is by far the largest tonnage offered in this market this year. Large lots of practically all grades of Scrap are included, amounting to more than 8000 tons, of which 2000 tons are Rerolling Rails. The Baltimore & Ohio and Wisconsin Central lists were closed last week and slightly higher prices were secured on such material as Iron Axles and Fish Plates. The Rock Island and Illinois Central lists closed on Tuesday and the awards will be announced some time this week. It is generally believed that exceedingly low prices will result from these heavy offerings, although it is possible that the railroads may withdraw their material if satisfactory quotations are not made. The range of prices paid by large consumers to producers and dealers, per gross ton, car lots, f.o.b. Chicago, is as follows:

Old Iron Rails	$20.50 to $21.00
Old Steel Rails, 4 feet and over	15.50 to 16.00
Old Steel Rails, less than 4 feet	13.50 to 14.00
Heavy Relaying Rails, subject to inspection, 50 pounds and under	27.00 to 27.50
Old Car Wheels	19.00 to 19.50
Heavy Melting Steel Scrap	13.50 to 14.00
Frogs, Switches and Guards	13.50 to 14.00
Mixed Steel	12.00 to 12.50

The following quotations are per net ton:

Iron Fish Plates	$17.00 to $17.50
Iron Car Axles	22.50 to 23.00
Steel Car Axles	18.00 to 18.50
No. 1 Railroad Wrought	14.50 to 15.00
No. 2 Railroad Wrought	13.50 to 14.00
Locomotive Tires, smooth	14.00 to 14.50
Railway Springs	13.50 to 14.00
No. 1 Dealers' Forge	11.50 to 12.00
Mixed Busheling	9.00 to 9.50
Iron Axle Turnings	11.00 to 11.50
Soft Steel Axle Turnings	11.00 to 11.50
Machine Shop Turnings	11.00 to 11.50
Cast Borings	8.50 to 9.00
Mixed Borings, &c	8.50 to 9.00
No. 1 Mill	8.50 to 9.00
No. 2 Mill	7.50 to 8.00
No. 1 Boilers, cut to Sheets and Rings	9.50 to 10.00
No. 1 Cast Scrap	13.00 to 13.25
Stove Plate and Light Cast Scrap	10.50 to 11.00
Railroad Malleable	13.50 to 14.00
Agricultural Malleable	12.50 to 13.00

The American Sheet & Tin Plate Company announces the removal of its Chicago offices from the Rookery to suite 707 in the First National Bank Building.

Cleveland

CLEVELAND, OHIO, April 10, 1906.

Iron Ore.—Some hopes are now expressed of the ability of the interests concerned to settle the lake labor difficulty before May 1. At that time the contract with the lake labor organizations will expire. The conference at Erie, Pa., between the longshoremen and the lake seamen is scheduled for the first of next week, and it is believed that it will result in the abandonment of a protectorate over the lake pilots by the longshoremen and the affiliation of the former with the seamen, which would act as an automatic solution of the present difficulty. The whole point to the present controversy is the recognition of the union of lake pilots. The longshoremen sought to have this incorporated as a part of their agreement. Since the longshoremen deal exclusively with the dock managers, who are not operators of boats, it was manifestly out of place for the dock managers to try to bind the lake vessel owners to any agreement with the pilots. This view is now being recognized by all concerned. The seamen have already an agreement with the Lake Carriers' Association. In expectation that the difficulty will soon be settled, many of the boat owners are starting their craft up the lakes and boats are now lying in Lake St. Clair waiting for the ice to open in the Soo channel. April 20 is now spoken of as the possible date of opening. The vessel owners have gained one point at least in the delay of the opening of navigation by a month. The late opening has stiffened materially views of the wild rate on ore, in spite of the surplus of vessel tonnage.

Pig Iron.—Inquiries for Pig Iron have been heavy in this territory in the past week. Most of the inquiries of the week have involved deliveries through the remainder of the second quarter, with some lapping over into the third quarter. It cannot be said that business is being closed in any volume for delivery after July 1. On one block of No. 2 Foundry, amounting to 12,000 tons, taken in the week competition was sharp. It is known that some good-sized lots of No. 2 Foundry have been sold at $16.50 in the Valley, although they are said to be the exception. The Southern producers are offering a little more iron in this territory and the report is that some No. 2 Iron has been sold at $13.50, Birmingham. Bar Iron mills have been using gray forge instead of scrap, thus weakening the scrap market. The Coke market is holding about steady. The best grades of 72-hour Foundry Coke are now selling at $3.25.

Finished Iron and Steel.—Interest centers in the Bar Iron trade, which is subject to the most irregularity. Some of the Chicago and Indiana mills have made quotations on the basis of 1.50c., Pittsburgh, and announce that they are open for a good deal of business at that price. This has not affected the strictly local situation. One of the Cleveland mills has enough business to keep it running until September 1, and is in such position that unless its new capacity, under construction, becomes active shortly, the mill will be embarrassed in making deliveries. Other mills are looking for business but quote 1.65c., Youngstown, and report sales at that price, despite the Western opposition. The increased use of Steel is said to be responsible for the lower-

ing of the price on Bar Iron by Western mills. In Steel Bars there are heavy specifications against old contracts and deliveries from mill require six to eight weeks, although some of the smaller sizes are easier. Jobbers report that their Structural business for April promises to be the heaviest on record if buying continues at the rate of the past ten days. Much of this buying is by interests that have depended on the mills and have been disappointed in deliveries. Big jobs calling for heavy tonnage in Shapes are not developing rapidly in this territory, however. Some of the Eastern mills are still giving prompt shipment on a premium of about $4 a ton delivered. Sheets are stronger, with mill deliveries made in about six weeks and consumers coming to the jobbers for early needs. Prices out of stock hold at 2.15c. for No. 10; 2.70c. for No. 28 one pass cold rolled and 3.70c. for No. 28 Galvanized. The Billet market continues strong with the supply short. A few sales of Forging Billets were made in the past week at $35, delivered in Cleveland.

Old Material.—The Scrap market is still easy. The consumption is heavy, but the mills do not seem to be buying liberally. The turn in the Pig Iron market has been expected to give a little better tone to Scrap, but so far no such results have been seen. The following represent dealers' quotations to the trade, f.o.b. Cleveland, gross tons: Old Steel Rails, $14.50 to $15.50; Old Iron Rails, $22 to $23; Iron Car Axles, $17.50 to $18.50; Heavy Melting Steel, $14 to $15. Net tons: Cast Borings, $8.50 to $9; No. 1 Busheling, $12.50 to $13.50; No. 1 Railroad Wrought, $15 to $16; No. 1 Cast, $13.50 to $14.50; Stove Plate, $11; Iron and Steel Turnings and Drillings, $10 to $11.

Philadelphia.

REAL ESTATE TRUST BUILDING, April 10, 1906.

The undertone of the market is remarkably strong and it appears to be shaping for increased activity and possibly somewhat higher prices. There is hardly a weak spot anywhere, and although some articles are stronger than others there is no article that is really weak. Under ordinary conditions it would be safe to say that prices were going higher, but until some definite arrangement is made between the Coal operators and their employees it is impossible to take any fixed position on the market. The general situation, however, is unusually strong, and with anything like a fair chance it looks as if business during the remainder of the year would equal if not surpass that of last year. The impression seems to be that some way will be found to avoid the consequences of a disastrous strike, as that appears to be the only obstacle in the way of continued prosperity, and it is hardly conceivable that some plan cannot be evolved by which it may be avoided. So far it cannot be claimed that it has caused any actual interruption to business, but the fact that we are within a few hours, or at most a few days, of a settlement favorable or unfavorable naturally tends to increased anxiety as the crisis approaches. Meanwhile a good many buying orders are around and it is likely that order books will receive large accessions in the almost immediate future.

Pig Iron.—The undertone of strength which was noted last week has been more than maintained, so that the inside figures which were given at that time are practically obsolete, while the outside figure is about 25c. higher. It is a very uneven market, however, some grades, such as No. 2 Foundry and Basic Iron, being in active demand and extremely scarce for second quarter's deliveries; but the greatest activity has been in the low grades of Iron for the Pipe foundries, which have taken in lots of 1000 to 5000 tons each, just as they could be picked up, although the demand is by no means satisfied, and at a cost of $16.25 to $17 for No. 3 and No. 4 grades for nearby deliveries there is plenty of business yet to be had. As a set off to this, however, there is very little doing in Puddling Irons, the demand for Skelp and Muck Bar having fallen off to almost nothing, but the furnaces are not carrying large stocks, so that there is no great pressure to sell, although mill grades are relatively lower than other descriptions are. Basic Iron is inactive, although prices are strong, and if a buying movement were to set in it is almost certain that prices would cross $18. A few 500 and 1000 ton lots have been taken at $17.90 to $18, delivered, but furnaces are much behind with their shipments, so that they are not in a position to accept business unless for the third and fourth quarter deliveries, in regard to which buyers have not shown any great interest until within the past few days. There is a good deal of inquiry going on and it is extremely probable that something important will be done before the close of the month. The next movement will no doubt be in Steel making materials. Pipe founders have held the center of the stage during the past two or three weeks and for local use anywhere from 20,000 to 30,000 tons have been taken, and more could be placed if prices were right. Basic is held at $18 for the third quarter, and in view of the oversold condition of the furnaces it is not likely that much if any better than that could be done, and with anything like a heavy demand makers would probably withdraw the $18 quotation. For the present, however, to-day's prices for Philadelphia and nearby deliveries would be about as follows:

No. 1 X Foundry	$19.00 to $19.25
No. 2 X Foundry	18.50 to 18.75
No. 2 Plain	17.75 to 18.00
Standard Gray Forge	16.50 to 16.75
Basic, nominal at	17.90 to 18.00
Low Phosphorus	25.00 to 25.50
Bessemer	19.75 to 20.25
Malleable Iron	19.00 to 19.25

Steel Alloys.—The market is very much easier and lots of good size have been taken, one of nearly 1000 tons of Ferromanganese, at something less than $80, delivered to a nearby mill. Silico Spiegel, 10 and 18 per cent., also sold at $42.50, and second quarter Ferro at from $110 to $125, according to promptness of delivery.

Steel.—There is a first-class demand for Open Hearth Billets, and $29 is an inside figure for the most gilt-edged business. Small lots command $29.50 to $30, and Forging Billets $32.50 to $35.

Plates.—There is a demand which is large enough to keep most of the mills fully employed. Universal Plates are specially active, but Sheared Plates are inclined to dullness, although there is a great deal of work on the books, with good prospects for additions in the near future. Prices are unchanged, as last quoted:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.93½	1.98½
Marine	2.13½	2.18½
Locomotive Fire Box Steel	2.23½	2.28½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Extra per 100 pounds.
3-16-inch thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00

Structural Material.—There is a good demand, with excellent prospects for the remainder of the year. Better deliveries can be had, however, owing to new mills getting under full headway, thereby materially increasing the supply, although it is readily absorbed. Deliveries are now guaranteed in from 30 to 90 days, according to character of order. Beams, Channels and Angles are still quoted at 1.83½c. to 2c., delivered.

Bars.—The Bar Iron trade is going through a process of adjustment, although on the whole there appears to be some improvement over the past week or two. Questions of differentials will be considered at a meeting to be held in New York this week, which it is expected will be settled harmoniously, but the matter will be gone into very thoroughly. At 1.63½c. for Best Refined Iron plenty of business could be had, but most of the mills making this grade of material ask a trifle more than the figure above named. Steel Bars are in the usual good demand at 1.63½c., but deliveries are slow, and for prompt shipments a little more money has to be paid.

Sheets.—The demand for Sheets is very good, but prices are said to be unsatisfactory. At the present quotations for Sheet Bars it is impossible to make Sheets at current prices, but to hold their trade the mills seem to accept orders without much regard to profit. Present quotations are about as follows: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market has a strong undertone, but it is somewhat unsettled owing to lower prices reported from Western markets. The supply of Scrap is said to be much lighter than is usual at this season, consequently holders are not disposed to sell unless at full quoted rates. Bids and offers for deliveries in buyers' yards are about as follows:

Scrap Steel Rails and Crops	$17.00 to $17.25
No. 1 Steel Scrap	16.50 to 17.00
Low Phosphorus Scrap	21.00 to 22.00
Old Steel Axles	20.00 to 20.50
Old Iron Axles	25.50 to 26.50
Old Iron Rails	21.50 to 22.00
Old Car Wheels	16.75 to 17.00
Choice Scrap, R. R., No. 1 Wrought	20.00 to 20.50
No. 1 Yard Scrap	18.00 to 18.50
Long and Short	16.50 to 17.00
Machinery Scrap	15.50 to 16.00
Wrought Iron Pipe	14.50 to 15.50
No. 1 Forge Fire Scrap	15.00 to 15.50
No. 2 Light Ordinary	10.75 to 11.25
Wrought Turnings	13.75 to 14.25
Axle Turnings, Choice Heavy	14.50 to 15.00
Cast Borings	10.25 to 10.50
Stove Plates	12.50 to 13.00
Grate Bars	12.00 to 12.50

Commencing May 1, Matthew Addy & Co. will have the entire output of the Princess Iron Company's furnace at Glen Wilton, Va., for sale, at their various offices throughout the United States.

Pittsburgh.

PARK BUILDING, April 11, 1906.—(*By Telegraph.*)

Pig Iron.—We note a very active inquiry for Bessemer and Basic Iron, and considerable tonnage has been sold. The United States Steel Corporation has bought from the Bessemer Pig Iron Association about 18,000 tons of Bessemer for April delivery at $17.25, Valley furnace, and 2000 tons of Basic for same delivery at $17, Valley furnace. W. P. Snyder & Co. have sold to the Cambria Steel Company about 10,000 tons additional Bessemer for April delivery at $17.25, Valley furnace. The Midvale Steel Company is in the market for 4000 tons of Bessemer, and the Crucible Steel Company also wants a moderate tonnage, both for early delivery. The market on Bessemer is very firm at $17.25 to $17.50, Valley furnace, while Basic is firm at $17, Valley furnace. The Westinghouse Electric & Mfg. Company has bought 7000 tons of Northern Foundry for its Cleveland works, 4000 tons going to Rogers, Brown & Co. and 3000 tons to Corrigan, McKinney & Co., prices being very close to $16.25, at Cleveland furnace, for No. 2. The same company bought 2000 tons for its Allegheny works on the basis of $16.50, Valley furnace, for No. 2 or slightly less; also 1200 tons of Southern on the basis of $13.50, Birmingham, for No. 2. We quote Northern grades of No. 2 Foundry at $16.50, Valley furnace, for good sized lots, and up to $17 for small lots. The market on Foundry Iron is rather weak, but it is believed that prices will soon show betterments, as consumption is heavy and consumers are taking in Iron they have bought as fast as the furnaces can ship it. Northern brands of Forge Iron are held at $15.75 to $15.85, Valley furnace, or $16.60 to $16.70, Pittsburgh. We note sales of about 1500 tons.

Steel.—We note a continued shortage of Bessemer and Open Hearth Steel, and the situation in this respect does not promise early relief. Price are unchanged.

(*By Mail.*)

The general situation in the Iron trade is showing betterment, the demand for Pig Iron being heavier, while there havet been some large contracts placed for Line Pipe which will require many thousands of tons of Plates. The United States Steel Corporation has bought about 18,000 tons of Bessemer Iron from the Bessemer Pig Iron Association at $17.25 at Valley furnace for April delivery, while the Cambria Steel Company has bought about 10,000 tons or more from W. P. Snyder & Co. at the same price and for the same delivery. There is also a fair amount of inquiry for Basic Iron, which is held at $17 at Valley furnace. The Westinghouse Electric & Mfg. Company, which was in the market last week for 12,000 tons of Foundry Iron for its Allegheny and Cleveland works, bought about 4000 tons for Cleveland, on which low prices were made, but has postponed buying the balance of the Iron, believing that by waiting it will be able to buy at lower prices. Foundry Iron is rather weak and Northern grades of No. 2 are offered as low as $16.25 at Valley furnace, while in the Cleveland district lower prices have been made by local furnaces. There is some inquiry for Forge Iron, which is held at about $15.85 to $16 at Valley furnace. The scarcity in Bessemer and Open Hearth Steel which has existed for so long still continues and seems to be getting worse. Some of the Tin Plate and Sheet mills are idle at times as long as a whole week, waiting for Steel to arrive. The Carnegie Steel Company is using its best efforts to relieve the situation by operating all its Steel plants to their utmost capacity and is doing the best it can for its customers, but at the same time the fact remains that there is an absolutely shortage of Steel capacity, particularly Open Hearth. In Finished Iron and Steel the demand is only fair, except that for Steel Rails and Structural Steel, which continues enormously heavy. The American Sheet & Tin Plate Company has announced an advance of 10c. per base box in Tin Plate, effective April 9. By some in the trade it is believed there will be an advance in Sheets before long of about $2 a ton. Prices on Coke of the best grades continue firm, but Scrap is weak and dull.

Ferromanganese.—We continue to quote 80 per cent. foreign Ferro for spot delivery at $125 to $135 per ton, the price depending largely on how badly the buyer needs it. For May and June delivery from $95 to $100 is quoted, while for balance of the year from $85 to $90 is asked.

Muck Bar.—There is absolutely no inquiry and we quote nominally at $28.50 to $29 for best grades, made from all Pig Iron. The Republic Iron & Steel Company is said to be out of the market as a seller.

Steel Rails.—Very heavy orders for Steel Rails continue to be placed, the Carnegie Steel Company having taken over 50,000 tons in the past week. It is now largely a question whether the mills will be able to furnish the enormous tonnage of Rails they have booked for this year's delivery. There is a heavy demand for Standard Section Rails from the traction lines, and the demand for Light Rails is also very active. We quote Standard Sections at $28, at mill. We quote Light Rails, as follows: 8-lb., $36; 10-lb., $32; 12-lb., $30; 16-lb., $29; 20-lb., $28.50; 25 to 45 lb., $27.50 to $28, maker's mill.

Rods.—There is a fairly active demand for Rods, and prices are very firm. We quote Bessemer and Open Hearth Rods at $34, and Chain Rods $35, maker's mill.

Skelp.—New business is scarce, but consumers are specifying freely on contracts. We quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Structural Steel.—Inquiries continue enormously heavy, and the Structural concerns are simply gorged with tonnage. The First National Bank Building, in this city, will be a one-story structure instead of an office building as originally planned, and the tonnage of Steel will be correspondingly less. No large contracts have been placed in this district recently, but there is a large amount of work in sight, on which bids will soon be ready. Prices are very strong, and we quote: Beams and Channels, up to 15-inch, 1.70c.; over 15-inch, 1.80c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.75c.; 8 x 8 and 7 x 3½ inches, 1.80c.; Zees, 3-inch and larger, 1.70c.; Tees, 3-inch and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—Specifications on contracts continue heavy, but the amount of new tonnage being placed is only fairly large. Most of the mills are now in position to make reasonably prompt deliveries, and on the narrow sizes some of the small Plate mills are shading official prices about $1 a ton. We quote Tank Plates, ¼-inch thick, 6¼ up to 100 inches in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Sheets.—New orders being placed with the mills are rather light, but buyers are specifying liberally on the large contracts placed some time ago when prices were lower than they are now. There is more disposition on the part of some mills to shade prices slightly to get tonnage and as a result the Sheet market is not as firm as it was. There is still a shortage in the supply of Sheet Bars, and it would not be surprising if some of the Sheet mills would build Open Hearth plants in the near future and make their own Bars. It is probable that the Empire Iron & Steel Company at Niles, Ohio, which has just changed hands, will do this, as the new owners intend spending a large amount of money in extensions and improvements to the works. As noted above, the tone of the Sheet market is weak and we quote: Black Sheets, Box Annealed, one pass through cold rolls, Nos. 10 to 12 gauge, 1.95c. to 2c.; Nos. 13 and 14, 2c. to 2.05c.; Nos. 15 and 16, 2.05c. to 2.10c.; Nos. 17 to 21, 2.10c. to 2.15c.; Nos. 22 to 24, 2.15c. to 2.20c.; Nos. 25 and 26, 2.20c. to 2.25c.; No. 27, 2.25c. to 2.30c.; No. 28, 2.35c. to 2.40c.; No. 29, 2.50c. to 2.55c., and No. 30, 2.60c. to 2.65c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.30c. to 2.35c.; Nos. 12 to 14, 2.40c. to 2.45c.; Nos. 15 and 16, 2.50c. to 2.55c.; Nos. 17 to 21, 2.65c. to 2.70c.; Nos. 22 to 24, 2.80c. to 2.85c.; Nos. 25 and 26, 3c. to 3.05c.; No. 27, 3.20c. to 3.25c.; No. 28, 3.40c. to 3.45c.; No. 29, 3.65c. to 3.70c., and No. 30, 3.90c. to 3.95c. We quote No. 28 Gauge Painted Roofing Sheets at $1.60 to $1.65 per square, and Galvanized Roofing Sheets, No. 28 gauge, at $2.95 to $3 per square for 2-inch corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Bars.—The report that the Steel Bar mills would make a concession in prices to the implement trade and to other large consumers to induce them to place their season contracts is strongly denied. In fact, some large season contracts have already been placed and at the full official price. It is also untrue that the Republic Iron & Steel Company

has reduced Iron Bars to 1.50c., Pittsburgh, as reported. This company is now quoting Iron Bars at 1.60c., Pittsburgh, in carload lots, but it is understood that some of the smaller makers are shading this price. New business in Steel Bars is only fairly heavy and the mills are steadily catching up on deliveries. We quote Steel Bars at 1.50c. base, half extras, for carloads and larger lots.

Cotton Ties.—The season on Cotton Ties opened April 5, and the tonnage for this year has been sold, the price being 85c. per bundle, at mill.

Tin Plate.—Effective Monday, April 9, the American Sheet & Tin Plate Company advanced prices on Tin Plate 10c. per base box, or from $3.50 to $3.60 per base box. It is understood that the leading Tin Plate mills are pretty well sold up to July 1, or longer, at lower prices. Very little new business is being placed as leading consumers are covered ahead for some time. We quote Tin Plate at $3.60 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in ten days, on which price a rebate of 5c. a box is allowed for carloads and larger lots.

Merchant Steel.—New business continues light, but specifications on contracts continue to come in freely. It is understood that some of the implement makers have placed their season contracts, but that as yet no concessions in prices have been made. The market is fairly strong and we quote: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish up to 1½ x ½ inch, 1.65c., and Iron Finish, 1½ x ½ inch and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 inch, 2c., and 1⅛-inch and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.75c. to 1.80c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—The demand is quite active and we quote $2 to $2.05 per 100 lbs., Pittsburgh.

Spelter.—The market is dull and prices are weaker. We quote prime grades of Western Spelter at 5.90c., St. Louis, equal to 6.02½c., Pittsburgh.

Merchant Pipe.—Some large contracts for Line Pipe have been placed and additional tonnage is in the market. T. N. Barnsdall of Pittsburgh is at the head of a newly organized gas company known as the Wichita Natural Gas Company, Wichita, Kan., and has placed in the past week about 232 miles of 6 to 12 inch Line Pipe. E. W. Mudge & Co., Pittsburgh, who are selling agents for the La Belle Iron Works, Steubenville, Ohio, secured about 100 miles of the 10 and 12 inch, the balance being secured by the Wheeling Steel & Iron Company, Wheeling, W. Va. Included in the contract was 122 miles of 6 and 8 inch, which went to Spang, Chalfant & Co., while a small part was taken by the Mark Mfg. Company, Zanesville, Ohio. This is the largest contract for Line Pipe placed for some time. The Carnegie Natural Gas Company has placed 21 miles of 24-inch Line Pipe with the National Tube Company, the Pipe being 5-16 inch thick, and weighing 78 lbs. to the foot. The Philadelphia company of this city is in the market for 3000 tons of Wrought Iron Pipe, which will likely be placed this week. There is also an inquiry in the market for 22 miles of 8-inch Line Pipe for shipment to Kansas, to be used for a natural gas line. The Pipe mills are well filled up with tonnage, especially on the larger sizes, and the demand for Merchant sizes is also quite active. Prices continue low, the extreme discount on Merchant sizes of Steel Pipe remaining at 81 per cent. off to the large trade. Official discounts, which are shaded one point, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	%	%	%	%
⅛ and ¼ inch	72	58	69	53
⅜ inch	74	60	71	57
½ inch	76	64	73	61
¾ to 6 inches	80	70	77½	67½
7 to 12 inches	75	60	72½	57
Extra strong, plain ends:				
⅛ to ⅜ inch	65	53	62	50
½ to 4 inches	72	60	69	57
4½ to 8 inches	68	56	65	53
Double extra strong, plain ends:				
½ to 8 inches	61	50	58	47

Boiler Tubes.—The demand for Locomotive Tubes is very heavy and the mills are much behind in deliveries, prices being very firm. There is not much business being placed in Merchant Tubes, on which prices are shaded to some extent. Discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches	41	46
1¾ to 2¼ inches	41	58
2½ inches	46	60
2¾ to 5 inches	53	66
6 to 13 inches	41	58

Iron and Steel Scrap.—The market on Scrap continues very dull and prices are weak. Dealers who have stocks are anxious to make sales and would shade our prices more or less. We quote: Heavy Melting Scrap, $14.50 to $14.75; Bundled Sheet Scrap, $13.50 to $13.75; Old Steel Rails, short pieces, are $14.50 to $14.75; long pieces, for rerolling, $15.75 to $16; Cast Iron Borings are weak at $9; Machinery Cast Scrap, $15.25 to $15.50; Old Car Wheels, $17.75 to $18. All the above prices are for gross tons, f.o.b. Pittsburgh.

Coke.—There is a fairly heavy demand for Furnace Coke and for the best grades of strictly Connellsville Furnace Coke from $2.40 to $2.50 a ton at oven is quoted. Best grades of 72-hour Connellsville Foundry Coke are held at about $3 a ton at oven. For Main Line makes of Furnace and Foundry Coke lower prices are made. The output of Coke is very heavy, the product of the Upper and Lower Connellsville regions last week having been about 380,000 tons.

The M. Streng's Sons Company has purchased 8 acres of ground near Carnegie, Pa., where it will locate another Scrap Iron yard. The company's office will remain where it is at present, at River avenue and Walnut street, Allegheny City, Pa.

Cincinnati

FIFTH AND MAIN STS., April 11, 1906.—(*By Telegraph.*)

Pig Iron.—The general feeling among the trade is of a brighter cast than has been the case for a month or two. There appears to be quite a fair sprinkling of orders coming forward, all of them for light tonnage, with one or two exceptions. The week's purchase by the Westinghouse people of a good tonnage appears to have produced a very beneficial change in the general tone of the market and had the effect of firmly establishing prices that for a long time had been more or less unstable. One of the large Pipe makers is reported to have bought in the neighborhood of 40,000 tons for second quarter delivery, on a basis of $13.50, Birmingham, for No. 2. Another sale in St. Louis territory of 11,000 tons is reported, some of which was Northern Iron, and is said to have gone for about $16 at furnace. There are a number of smaller inquiries afloat, but most of the heavy consumers apparently are not ready to enter the market at present, at least beyond immediate needs. It is anticipated that the next few weeks will develop a stronger buying movement, as it is generally conceded that stocks are being rapidly decreased. The local Foundry trade is very busy and has contracts reaching into the summer months. The agricultural people, it is anticipated, will become factors in the general market within the next 30 or 60 days, and as the tonnage from this source is very considerable, it will probably impart a strong and firm tone to conditions. The Cincinnati Traction Company is reported to have placed an order with the Carnegie Steel Company last week for 15,000 tons of Steel Rails. Freight rates from Hanging Rock district to Cincinnati are $1.15 and from Birmingham $3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$17.00 to $17.50
Southern Coke, No. 2	16.50 to 17.00
Southern Coke, No. 3	16.00 to 16.50
Southern Coke, No. 4	15.50 to 16.00
Southern Coke, No. 1 Soft	17.00 to 17.50
Southern Coke, No. 2 Soft	16.50 to 17.00
Southern Coke, Gray Forge	15.25 to 15.75
Southern Coke, Mottled	14.50 to 15.00
Ohio Silvery, No. 1 (8 per cent. Silicon)	21.65 to 22.15
Lake Superior Coke, No. 1	17.65 to 18.15
Lake Superior Coke, No. 2	17.15 to 17.65
Lake Superior Coke, No. 3	16.65 to 17.15

Car Wheel Irons.

Standard Southern Car Wheel	$23.50 to $24.00
Lake Superior Car Wheel	22.00 to 22.50

Coke.—The market is rather quiet, with little new business in sight. Prices are holding firm, and the situation generally is unchanged. The best brands of Connellsville and Virginia Foundry Coke are quotable at $3 to $3.25, f.o.b. ovens, the inside figure prevailing in most instances.

Finished Iron and Steel.—The demand continues to show great strength and trade along all Structural lines is excellent. Since the price of Iron Bars has been placed on the same basis with Steel considerably more sales are noted. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in small lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ inch or heavier, 1.83c., in carload lots.

Old Material.—The Scrap Iron market is said to be only fairly active. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $15 to $15.50 per net ton; Cast Borings, $8.50 to $9 per net ton; No. 4 Cast Scrap, $12 to $13 per net ton; Iron Rails, $22 to $22.50 per gross ton; Steel Rails, rolling mill lengths, $15 to $16 per gross ton; Relaying Rails, 56 lbs. and upward, $28 to $29 per gross ton; Iron Axles, $24 to $24.50

per net ton; Car Wheels, $18.50 to $19.50 per gross ton; Low Phosphorus Scrap, $18 to $19 per gross ton.

In the last issue of *The Iron Age* mention was made that the Robert Field Sales Agency of this city had the exclusive agency for selling the output of Quinn Furnace Company of Gadsden, Ala. This was apparently an error, as we have later information that DeCamp Brothers and Yule Iron, Coal & Coke Company of St. Louis have been appointed sole agents for this furnace.

Birmingham

BIRMINGHAM, ALA., April 9, 1906.

Pig Iron.—The Pig Iron market shows marked improvement this week. Many inquiries for both large and small quantities have been coming in and orders ranging from 50 to 5000 tons have been booked. One of the largest operators in the district reports the sale of the entire make for the week, amounting to several thousand tons, and another one an order for 1500 tons, besides numerous smaller ones. So far as can be ascertained these bookings, which are both for immediate and future shipment, have been on a $14 No. 2 Foundry basis, although on the larger orders this may have been slightly shaded. Producers claim that the price of $14 is firmly established and that it is being paid without a protest or even a question. Shipments are moving with their accustomed regularity and very probably few of the furnaces have stocked any Iron for the past few months, except possibly some off grades. A number of furnaces are still out of blast undergoing repairs and the producing capacity of the district is now a little below its general average.

Old Material.—The Scrap market shows increasing strength, and while there has been little change in price, the tone is undoubtedly stronger. Dealers report deliveries are being called for on contracts a great deal more freely than a few weeks since, and with a better feeling in the Pig Iron market prices are expected to advance proportionately. Ample stocks are on the dealers' yards and they are quoting approximately the following prices per gross ton, f.o.b. cars here:

Old Iron Rails	$17.50 to $18.00
Old Iron Axles	18.00 to 18.50
Old Steel Axles	16.00 to 17.00
Old Car Wheels	16.00 to 16.50
No. 1 Railroad Wrought	15.00 to 15.50
No. 2 Railroad Wrought	13.50 to 14.00
No. 1 Country Wrought	13.50 to 14.00
No. 2 Country Wrought	11.50 to 12.00
Wrought Pipes and Flues	11.50 to 12.00
Railroad Malleable	11.50 to 12.00
Mixed Steel	9.50 to 10.00
No. 1 Machinery Cast	10.75 to 11.25
Stove Plates and Light Cast	8.75 to 9.25

One of the largest and most important deals in Coal lands in the history of the district has just been consummated in the purchase by Cook & Ten Broeck of St. Louis of 67,000 acres in Cullman County. It is understood that to develop this property a railroad some 20 miles in length will be built from Cullman on the Louisville & Nashville Railroad, intersecting the Southern and 'Frisco railroads and the proposed Birmingham branch of the Illinois Central Railroad. It is reported that openings are to be made at once and that the promoters have a contract with the Mexican Government for the entire output of the mines.

New York.

NEW YORK, April 11, 1906.

There has been some very good buying, particularly by Cast Iron Pipe interests. In some districts, notably in Virginia, local buyers have come into a market practically bare of supplies and have caused a stiffening. In New England the competition of Buffalo interests is keeping prices down. A number of the leading eastern Pennsylvania and of Alabama makers are asking higher prices, but as yet this is not universal, so that quotations remain unchanged. We quote Northern No. 1 Foundry, $18.50 to $19; No. 2 Foundry, $18 to $18.75; No. 2 Plain, $17.50 to $18. Southern Iron is quoted $18.50 to $18.75 for No. 1 Foundry, and $17.75 to $18 for No. 2 Foundry.

Steel Rails.—Each week adds to the difficulty of arranging rollings for the business that is pressing upon the mills. It is evident that Rail buying for 1906 must soon drop down to relatively small weekly totals, for even now the effort to take care of each week's additions is like attempting to pour more into a vessel already full. A considerable order for a Western road is now pending, for example, and the only delay in placing it is due to the inability of mills to meet deliveries wanted. Among contracts placed in the past week are 11,000 tons for the Northern Electric Company, 5000 tons additional for the Great Northern, 12,500 tons for the Atlanta & West Point Railroad, 2000 tons additional for the Baltimore & Ohio, 1300 tons for the East Carolina Railway, 5300 tons for the New York, Auburn & Lansing, 2300 tons for the Evansville & Eastern Electric Railway and 1650 tons additional for the Erie.

Structural Material.—The conditions in the Structural Steel trade are very strong, and business is still coming to the mills at a faster rate than shipments are being made on old contracts. The republication of specifications for the Manhattan bridge by the Department of Bridges of the City of New York is the event of the week locally. Bids are to be opened on April 30, 1906. It will be recalled that the contract for this bridge was given in the fall of 1905 to the Pennsylvania Steel Company, but the award was declared invalid by the courts. The total of Steel called for is 83,728,200 pounds, or 41,864 net tons, distributed as follows: Anchorages, 5,395,000 pounds; towers, 25,270,200 pounds; cables, 15,902,100 pounds; main span, 17,983,500 pounds; side spans, 19,420,000 pounds. Either Basic or Acid Open Hearth Steel will be accepted. Last year Acid Steel was required. The American Bridge Company took orders amounting to 9000 tons last week, and this week, thus far, has closed 5500 tons for bridges for the Cincinnati, New Orleans & Texas Pacific Railroad (Queen & Crescent route); also 6000 tons for the Jersey City power house of the Hudson Company and 600 tons for new buildings for the Stirling Company, at Barberton, Ohio. The Lehigh Valley Railroad has placed its order for 7000 tons of bridge work with a general contracting firm. The latter has not yet given out the contract for fabrication. Bids have been asked in the week on the superstructure of the new freight pier of the Baltimore & Ohio Railroad at Locust Point, Md. The framework will take 2000 tons of Steel. Quite a tonnage of important business in New York City is near the point of being placed. The addition to the Trinity Building and the new building adjoining which will be erected by the same company will call for about 10,000 tons. The contract has not yet been placed for the high building the City Construction Company is to erect at the corner of Cortlandt street and Broadway. This will call for upward of 10,000 tons. Firms carrying stocks of Structural Material are having a steady business from buyers whose wants cannot be taken care of in time by the mills. Some new contracts are being entered into for Structural Material for delivery in the second half of the year by jobbers and erecting companies which carry stocks at their yards. We make the following quotations for mill shipments, f.o.b. New York: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c.; Beams, 18 to 24 inch, 0.10c. extra; Angles, over 6 inches, 0.10c. extra.

Bars.—The Bar Iron market is in considerably better shape. Orders have been decidedly more numerous the past week and some good contracts have been closed. The demand for Bolts and Nuts continues active, with inquiries received in this market from New England and other districts usually not making purchases here, and the activity of that branch of trade naturally strengthens Bar Iron. Prices are firm at 1.64½c., tidewater, as the inside rate, with some mills not only holding at 1.74½c. but claiming to have taken business at this price. Steel Bars are in fair demand, with quotations ranging from 1.64½c. to 1.74½c., tidewater, according to specifications, time of delivery, &c. The largest sale reported is one of 500 tons.

Plates.—Current orders are not large, but are being received in sufficient quantity to keep sales agents fairly busy. Specifications on contracts are being freely given by consumers who placed orders some time ago. Quotations are firmly maintained as follows, at tidewater: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Fire Box Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—March is stated by leading manufacturers to have been the heaviest month in their history. Orders are still coming in abundantly. This city placed an order for 5000 tons for Brooklyn last week, which was taken by a contractor who will make his own purchases of Pipe. No other large orders are reported for the week, but the general run of business is heavy. The whole country seems to be in the market for Pipe. Inquiries are coming to Eastern foundries from remote sections, showing that trade is active in every locality. We quote $30.50 per net ton for carload lots of 6-inch at tidewater, but the market is so strong that an advance seems likely.

Old Material.—The demand is better all along the line, although no material advance has been made in price. Dealers report sales of good tonnage of Steel Scrap, Cast Scrap and the cheap grades of rolling mill stock. The movement from dealers' yards is heavy. A great many foundries are now coming into the market for Cast Scrap and Stove Plate, and it is expected that a large tonnage will be taken during the current week. The railroad companies are freely disposing of their old material, evidently regarding the prices they now realize as satisfactory. Wrought Scrap is still quite dull, the rolling mills not being disposed to anticipate their wants for that class of stock. Approximate prices per gross ton for New York or vicinity are as follows:

Old Iron Rails	$20.00 to $21.00
Relaying Rails	25.50 to 26.00
Old Steel Rails, rerolling lengths	16.50 to 17.50
Old Steel Rails, short pieces	15.00 to 16.00
Heavy Melting Steel Scrap	15.00 to 16.00
Standard Hammered Iron Car Axles	24.50 to 25.50
Old Steel Car Axles	20.00 to 21.00
No. 1 Railroad Wrought	19.00 to 20.00

Iron Track Scrap	16.50 to	17.50
No. 1 Yard Wrought, long	17.00 to	18.00
No. 1 Yard Wrought, short	15.00 to	15.50
Wrought Pipe	13.50 to	14.50
Light Iron	10.00 to	10.50
Cast Borings	9.00 to	9.50
Wrought Turnings	12.50 to	13.50
Old Car Wheels	17.00 to	18.00
No. 1 Machinery Cast	15.00 to	16.00
Stove Plate	11.50 to	12.00
Grate Bars	10.00 to	10.50
Malleable Cast	16.50 to	17.50

Metal Market.

NEW YORK, April 11, 1906.

Pig Tin.—Still higher prices have been recorded this week and the metal was sold on the London Exchange as high as £176. To-day's price is the same. The price of futures had been dragged up under the influence of the advance in spot and is now £171. The latter part of last week Tin sold at 38.15c. and 38.10c., advancing sharply to 38.50c. to 38.65c. on Monday, when there was a good demand and some good sized lots went into consumption. On the 10th prices receded slightly and the metal was sold at 38.50c. To-day's price is 38.60c. The London corner is apparently good for all of April and will undoubtedly carry over until some time in May. The stocks in this country are not large and undoubtedly there will be more or less of a scramble for supplies for some time to come. Business was done on the 10th ex-steamship Minnetonka at 38.40c. The statistical position is so strong that higher prices may be looked for before much lower levels are reached. The arrivals so far this month aggregate 2508 tons and the afloats are 1540 tons.

Copper.—Business has been at a somewhat lower ebb this week, but prices have been maintained and the position is firm. There has been some various talk to the effect that the Copper consumers in the Connecticut Valley are not finding business so active. This is undoubtedly a rumor, as business appears to be very active. Still a change in price will undoubtedly come some time, and the warning may be taken as to what is to be expected when consumption overtakes production. For shipment, 30 days, we quote prices unchanged at 18.62½c. to 18.75c. for Lake, 18.37½c. to 18.62½c. for Electrolytic and 18.25c. to 18.50c. for Casting Grades. In London the market is practically unchanged at £84 17s. 6d. for spot, £81 12s. 6d. for futures and £88 10s. for Best Select. The European trade has been keeping up in good volume, although the exports so far this month aggregate 3849 tons.

The world's Copper production, as figured by Henry R. Merton & Co., in gross tons, is as follows:

	1905.	1904.	1903.
Australia	36,560	34,160	29,000
Canada	20,535	19,185	19,320
Chile	29,165	30,110	30,930
Germany	22,160	21,045	21,205
Japan	35,910	34,850	31,360
Mexico	65,185	50,945	45,315
Russia	8,700	10,700	10,320
Spain and Portugal	44,810	47,035	49,740
All other countries	32,715	30,925	29,980
United States	413,070	362,740	311,627
Totals	708,810	641,695	578,797

These figures are obtained from official sources whenever possible; the production in this country is taken from official reports for 1903 and 1904, while that of 1905 is estimated by Henry R. Merton & Co.

Pig Lead.—Business has been confined to continued purchases of small lots at the unchanged price of 5.35c. to 5.45c. for spot lots. Shipments from the West, however, are a trifle easier at 5.25c. The American Smelting & Refining Company continues to quote shipment Lead in 50-ton lots at 5.35c. The St. Louis market is dull at 5.25c. The London market is unchanged from last week at £15 15s.

Spelter.—The market is easier at 6c. to 6.10c. for spot April and May delivery. In St. Louis prices are also lower at 5.90c. and business continues to be only of a routine character. In London prices are unchanged at £25 10s.

Antimony.—Again the market has advanced, Cookson's and Hallett's now being held at 19.50c. to 20.50c.; other brands at 19c. to 20c. There seems to be a fair supply in this market, but the metal is held very closely and the holders are in position to dictate almost any price they choose.

Quicksilver.—Flasks of 75 lbs. in 100-flask lots are held at $41. In San Francisco domestic orders are held at $40; export at $39. Rothschild's price is unchanged in London at £7 7s. 6d.

Nickel.—Large lots are selling at 40c. to 45c.; smaller quantities at 50c. to 60c.

Tin Plates.—An advance of 10c. per box was made Monday on account of the higher price for Pig Tin. For 100-lb. IC Coke Plates, f.o.b. Pittsburgh, $3.60 is quoted; f.o.b. New York, $3.79. Trade is very active, particularly for Bright Plates.

Old Metals.—There is a little better demand for Copper Scrap, also some firmness in Brass Scrap, but dealers' selling prices are unchanged from last week. Stocks in the hands of dealers are small. We quote dealers' selling prices as follows:

	Cents.
Copper, Heavy Cut and Crucible	17.75 to 18.00
Copper, Heavy and Wire	17.25 to 17.50
Copper, Light and Bottoms	15.50 to 16.00
Brass, Heavy	11.75 to 12.00
Brass, Light	10.00 to 10.25
Heavy Machinery Composition	15.50 to 15.75
Clean Brass Turnings	10.25 to 10.75
Composition Turnings	13.00 to 13.25
Lead, Heavy	5.00 to 5.15
Tea Lead	4.85 to 4.90
Zinc Scrap	4.90 to 5.10

Iron and Industrial Stocks.

NEW YORK, April 11, 1906.

Speculation in stocks has been decidedly checked, and most prices have been depressed by unusually high interest charges on money for this time of the year. The New York bank statement on Saturday showed that the clearing house banks of the city had drawn quite considerably on their legal reserve. This has not happened in April for over 20 years. The effect is seen in the lower prices ruling on active industrial stocks. From Thursday until Tuesday, inclusive, prices on active stocks receded as follows: Car & Foundry common 44⅞ to 41½; Locomotive common 69¼ to 66½; Pressed Steel common 54 to 51¾; Republic common 32¼ to 29¾, preferred 103¼ to 102; Sloss-Sheffield common 84½ to 79; Cast Iron Pipe common 52 to 49¾; Steel common 43¼ to 40½, preferred 108¾ to 106⅛. Colorado Fuel was under exceptional pressure, which is ascribed to the effort now being made to raise additional money for continuing improvements. This stock declined from 64 to 59¼. Last transactions up to 1.30 p.m. to-day were made at the following prices: Can common 87⅜, preferred 65¼; Car & Foundry common 43, preferred 100¾; Locomotive common 68, preferred 115½; Steel Foundries common 12, preferred 46; Colorado Fuel 60⅞; Pressed Steel common 52½, preferred 98; Railway Spring common 55⅝; Republic common 30¼, preferred 102¼; Sloss-Sheffield common 80⅛; Tennessee Coal 150; United States Cast Iron Pipe common 51, preferred 93; United States Steel common 41⅞, preferred 107⅝.

The Republic Iron & Steel Company is reported to be doing better than ever before. For the quarter ending March 31 the net earnings are placed at $1,100,000, the highest on record. The March earnings were about $400,000. The best year the company has thus far had was the fiscal year ending June 30, 1900, when the net earnings were $3,643,728. Its preferred stock dividends take about $1,470,000 per annum.

The Hudson Iron Company, 11 Broadway, New York, has made a mortgage to the Knickerbocker Trust Company, New York, trustee, to secure an issue of $1,000,000 first mortgage 5 per cent. bonds, issuable as follows: $450,000 forthwith for the retirement of certain promisory notes and the payment for a part of the mortgage property; $200,000 from time to time for corporate purposes; $120,000 reserved to retire a like amount of first mortgage 20-year 5 per cent. bonds of John R. Ferrier, secured by mortgage to the Standard Trust Company, trustee, and dated October 1, 1901; $80,000 on account of second mortgage bonds made by John R. Ferrier; $25,000 to pay a real estate mortgage dated June 30, 1904; $125,000 for extension improvements and working capital on conditions stated in mortgage. The sinking fund, to begin in 1908, is to be $20,000 yearly, with a royalty of 25 cents per ton on each ton of ore mined at the Hudson mines. The mortgage covers 546 acres of land and a blast furnace plant formerly belonging to the Secaucus Iron Company at North Bergen, N. J., and about 1200 acres of mining property and plant in the towns of Highlands and Woodbury, Orange County, N. Y.

The annual report of the National Lead Company shows net earnings of $2,082,632.33 in 1905, which were the largest in the company's history and were $486,939 more than in 1904. The surplus account was $2,515,243.87 on December 31, 1904, and with the addition of the net earnings in 1905 amounted to $4,597,876.20, out of which preferred stock dividends of $1,043,280 were paid in 1905, leaving the surplus $3,554,596.20 on December 30, 1905. The balance sheet shows a heavy decrease in liabilities. President L. A. Cole states that favorable contracts for raw materials have been made extending over a period of years. The directors hope and expect that, commencing with July 1, dividends will be earned and regularly paid on the common stock.

Dividends.—United States Cast Iron Pipe & Foundry Company has declared the regular quarterly dividends of 1¾ per cent. on the preferred stock and 1 per cent. on the common stock.

Harbison-Walker Refractories Company, Pittsburgh, Pa., has declared a quarterly dividend of 2½ per cent. on its preferred stock, payable April 20.

The Vulcan Detinning Company has declared the regular quarterly dividend of 1¼ per cent. and an extra dividend of 1 per cent. on the preferred stock, payable April 20. The

payment of the extra dividend reduces the accumulated dividend account to 8¼ per cent.

The Atha Steel Casting Company.—The Atha Steel Casting Company has been incorporated under the laws of New Jersey with $500,000 authorized capital to succeed to the business of Benjamin Atha & Co., whose steel casting plant is located on Lister avenue, Newark, N. J. It is announced that Benjamin Atha will retire as president of the company, and Henry G. Atha, his son, who has been vice-president, will devote his interests to the Atha Tool Company. The new company will issue bonds which will be turned over to the Security Investment Company of Pittsburgh, of which the Atha Steel Casting Company is to be a subsidiary corporation. Herbert B. Atha, son of Benjamin Atha, who was treasurer of Benjamin Atha & Co., will become vice-president and general manager of the new company, and William D. Uptegraff of Pittsburgh, who is secretary of the Security Investment Company, will be made treasurer of the Atha Steel Casting Company. Lewis A. Shepherd, who was connected with the old company, will be the secretary of the new corporation. Preparations are being made to enlarge the Atha plant to double the present size. The plans of the company have not been announced as yet, but it is understood that George Westinghouse is heavily interested in the Security Investment Company and will control the new corporation.

Independent Fire Brick Consolidation.—Active work will be started in a few days looking to the merger of a number of independent fire brick manufacturers in Western Pennsylvania. The appraisement of the plants that are to enter the new combination will be made next week, at which time it is expected that officers will be elected and an application made for a charter. Among the more important companies which are to be included are the Joseph Sisson Fire Brick Company, Connellsville, Pa., which has a daily output of about 100,000 fire brick; Savage Fire Brick Company, Johnstown, Pa., which also has plants at Hyndman, Williams and Keystone, and a daily output of about 100,000 fire brick, and the Reese-Hammond Fire Brick Company, Bolivar, Pa., which has a daily output of about 250,000 fire brick. It is also expected that the Dunbar Fire Brick Company, Dunbar, Pa., whose plant was recently destroyed by fire, will join the combination. It is claimed that the daily output of the works that are to be included in the merger will be very close to 2,000,000 fire brick and will make it the largest single fire brick company in the country.

The Northwestern Iron & Steel Company, Seattle, Wash., has been incorporated for the purpose of manufacturing iron and steel. The company is capitalized at $11,000,000, of which $1,000,000 is 7 per cent. preferred and $10,000,000 common. Walter Kennedy, Pittsburgh, is connected with the company and is reported as stating that within a few weeks he would be ready to begin the work of constructing the company's plant. Its first cost would be $5,000,000, with additions every year for some time to come. About 3,000 men will be employed at first, and he made the prediction that in time the West would be far ahead of the Atlantic Coast in the production of iron and steel. He said the people he represented have secured deposits of iron ore aggregating 100,000,000 tons and more than that amount of coking coal. These iron deposits, he said, are scattered from California to Vancouver Island, while the coal for the greater part is located in Pierce County, State of Washington. James A. Moore, a Seattle capitalist, has been chosen president of the new company, and L. H. Mershon, 11 Broadway, New York, vice-president.

The *Engineering and Mining Journal*, New York, celebrated its 40th anniversary March 31. The issue for that date contains a number of articles of a reminiscent character, with portraits of men who bore the editorial burden in the early as well as the recent years of the paper. It was started as the *American Journal of Mining*, March 31, 1866, by Western & Co., with George Francis Dawson the first editor. The name of the paper was changed to its present one after two years. Rossiter W. Raymond was editor from 1867 to 1874. In January, 1874, the late Richard P. Rothwell became an editor, afterward acquiring the ownership of the paper. In 1905 the Hill Publishing Company, of which John A. Hill is president, purchased the paper. W. R. Ingalls, who has been on the editorial staff for many years, is editor in chief. The paper has always been most ably conducted, being now, as it has been from its earliest days, one of the leading journals of the world in the mining field.

In connection with the launching of the steamer Harvey D. Goulder at Lorain, Ohio, on March 31, President James C. Wallace of the American Shipbuilding Company said that on the Great Lakes the shipyards have now reached the point of manufacturing ships; they no longer build them. The keel of the Goulder was laid just eight weeks previous to the launching and it was expected that she would have a load of coal aboard on April 20 and be ready for her maiden trip. Construction work thus required but 11 weeks. The steamer is one of the largest on the lakes, being 545 feet over all, 525 feet keel, 55 feet beam and 31 feet deep.

The Virginia Electrolytic Company, 97 Cedar street, New York, has been formed to prosecute electrolytic industries. It has taken over the original plant of the Willson Aluminum Company, at Holcomb's Rock, Va. The Willson Aluminum Company retains its large plant and power at Kanawha Falls, W. Va., and will continue the manufacture of ferrosilicon and other lines of electric smelting there. George F. Seward is president of the Virginia Electrolytic Company. He is vice-president of the Willson Aluminum Company and retains all his interests in that company.

A preliminary report issued by the Geological Survey of Canada shows that the mineral production of the Dominion in 1905 was valued at $63,574,707, as compared with $60,073,987 in 1904. The production of copper was 47,696,502 pounds, compared with 42,970,594 pounds in 1904; nickel, 18,876,315 pounds, against 10,547,883 pounds; lead, 55,961,000 pounds, against 38,000,000 pounds; pig iron from Canadian ore, 70,554 net tons, against 68,297 tons; iron ore exports, 116,779 net tons, against 168,828 tons.

The Southern iron market is now firmly on the basis of $14 for No. 2 Foundry, Birmingham. The Woodward Iron Company has announced its withdrawal from the market, having closed a large tonnage during the past week for future delivery. The Sloss, Republic and Tennessee companies are firmly maintaining prices, on the basis of $14, agreed upon at the meeting held last week.

The Bechtold Crucible Steel Company, Canal Dover, Ohio, has bought part of the equipment in the plant formerly operated by the Burns Uniform Metallic Steel Company, at Latrobe, Pa. Included in the equipment is an open hearth melting furnace, which for a time was leased by the Firth Sterling Steel Company of Pittsburgh.

Edwin N. Ohl, Alexis W. Thompson and Frank Pierce have bought the Sharpsville Furnace at Sharpsville, Pa. The stack will be rebuilt, a skip hoist added and other improvements made, which will require three or four months.

The steamer James B. Laughlin, the second of the ore fleet the Jones & Laughlin Steel Company is building, was launched at the Ecorse yard of the Great Lakes Engineering Works, Detroit, on Saturday, April 7. The Laughlin is 550 feet long and 56 feet beam.

The malleable founders are meeting again to-day, but it is not probable that any concerted action will be taken regarding iron purchases to cover contracts that will be placed by large implement makers.

Peace Prospects in the Coal Trade.

In the face of a strongly worded protest from the independent interests in the anthracite coal industry against any arbitration whatsoever with the miners, the coal operators have replied to the arbitration proposal of John Mitchell and his committee with a counter proposition in which they agree to arbitrate just two of the miners' seven demands. These are the question of wages and the construction of the present conciliation board.

The operators are unwilling that the conciliation board, which is one of the subjects in dispute, shall be the arbitrators, but propose the members of the Anthracite Strike Commission. They would first have the members of this commission, or such as can serve in the present emergency, decide whether new conditions have arisen justifying any change in their award of three years ago. If they decide that such is the case, the operators would restrict the inquiry to just the two questions mentioned, disregarding entirely such matters as the eight-hour day, the "check-off" system and recognition of the union.

Furthermore, the operators propose that in the arbitration of the wage question the reduction of wages shall be considered as well as that of an increase, thus leaving them the chance to show that the payment of the present wages is not justified by recent trade conditions.

While the miners' committee refused to discuss the operators'' counter proposition, enough was learned to make it practically certain that the committee will ask for an amendment giving the arbitrators the right to take up the eight-hour demand anyway. They are, however, willing to accept the Anthracite Coal Strike Commission in place of the conciliation board.

The bituminous operators have submitted to the United Mine Workers a proposition to arbitrate the questions at issue between them. No reply has yet been made to this offer.

New Publications.

Producer Gas and Gas Producers. By Samuel S. Wyer. Crown 8vo, cloth. Pages 296. Illustrations 112. Published by *The Engineering and Mining Journal*, New York. 1906. Price, $4.

The one recent predecessor of Mr. Wyer's book that covers in part the same ground is Mathol's "Modern Gas Engines and Producer Gas Plants." In the latter, however, the treatment of gas producers is subsidiary to the construction and operation of gas engines. The work before us shows a thoroughgoing handling of one of the most interesting subjects in the field of modern metallurgy, and that of power generation as well. In the first four chapters the author presents the ground work of the subject, dealing with fundamental physical and chemical laws pertaining to gases and giving definitions of terms. In the last of these introductory chapters the various commercial gases are described and data given on the combustion of their constituents. Eight brief chapters follow, dealing with the status of producer gas, classification of gas producers, their efficiency, the use of steam in gas production, regeneration and recuperation, heat balance, fuel, and the requirements which an effective gas producer should fill. A longer chapter, 14, takes up the history of the gas producer, and in Chapter 15, American pressure gas producers are described, the author taking up in turn the Taylor, Langdon, Fuel & Gas Electric Engineering Company, Kitson, American Furnace and Machine Company, Amsler, Swindell, Forter-Miller, Smythe, Duff, Taylor, Wood, Wellman, Fraser-Talbot, Morgan, Loomis and Wile types. Considering the Siemens type as the real starting point of the modern gas producer industry, the author notes three important stages of development: The introduction of the Dawson gas producer in 1878, which was the first successful producer for power purposes; the introduction of the Mond by-product process on a large scale in 1889; and third, the introduction of the Benier Suction gas producer in 1895, which was the beginning of the use of gas producers in small sizes and compact units. Attention is called to the unsatisfactory performance of the gas producer in the matter of fuel economy, in spite of which few improvements were made until in recent years. It is noted that several industries to-day, chiefly the gas engine industry, are demanding a better producer than most manufacturers are offering.

Under the head of suction gas producers, it is noted that this term is applied only to those producers in which the air and steam is drawn through the fuel bed by means of the exhausting action of the gas engine piston on its charging stroke. A producer operated by induced draft made by an exhauster, or one in which the blast is directed downward, is not, therefore, a suction gas producer. Three classes of suction producers are described—those in which the vaporizer is an integral part of the producer, those having the vaporizer entirely separate from the producer, and those in which the vaporizer is not only separate, but is heated by the engine exhaust. The construction of the suction gas generator has been markedly improved of late, and its more general introduction in the near future, even for moderate and small powers, is to be expected. Many of these producers thus far installed in the United States have been built after European types, but American designs are being rapidly developed. The author describes the Wood, Otto, Weber, Backus, Wile, Nagel, Pintsch, Crossley, Fairbanks-Morse, Smith, Baltimore and Wyer suction producers.

In the consideration of by-product gas producers the book naturally gives a prominent place to the Mond producer, but it does not appear why but a single type of by-product coke oven producer is described. A chapter is given to gas producer power plants, a subject on which little literature exists. The necessity of adapting the gas engine to the particular gas available for its use is emphasized. It is stated on the authority of gas plant builders that an engine which will develop 100 horsepower with natural gas will give only about 80 horsepower with producer gas, a loss of 20 per cent. With a 200 horse-power engine this loss would be about 15 per cent., and with sizes above 300 horse-power it would be about 10 per cent. In the suction type of gas producer about 4 per cent. of the power of the engine will be consumed in drawing the gas through the producers and scrubbers.

The author is optimistic in his estimate of the future of the gas producer, and certainly the progress thus far made warrants a favorable estimate of the development to come. Mr. Wyer perhaps expects more than is likely to be realized for a long time from the gas producer as a solution of the smoke problem; but the high thermal efficiency of the gas engine and the storage dangers and high cost of gasoline will contribute to an increasing demand for producer gas power plants. The author believes the time is not far distant when producer gas locomotives, portable engines and marine plants will be in ordinary use.

Excellent features of this valuable contribution to gas producer literature are the chapter containing tables and other reference data and the one devoted to the bibliography of gas producers.

New Competition in the Foreign Rail Trade.—It appears that the International Rail Syndicate has encountered new competition. The Turkish Government asked bids some time ago on 14,000 tons of rails for the Hedjas Railroad and, according to the London *Iron and Coal Trades Review*, the order was allotted to the German works, whose low bid was £5 16s. 10d. per ton for the rails, delivered at Haifa. This bid was not low enough, however, to secure the business, as 8000 tons were awarded to the Providence Russe at £5 8s. 10d., delivered, and 6000 tons were awarded to the Austrian Alpine Mining Company at £5 10s. 5d., delivered. This is the first important business taken by mills outside of the international agreement since the Altos Hornos de Viscaya of Bilbao, Spain, took an order from the Southern Pacific Railroad last year and another order for delivery in Mexico, the two amounting to 21,000 tons. It appears that the success of the Austrian and Russian mills in securing the Turkish order was very much of a surprise to the companies party to the international rail agreement.

The Machinery Trade.

NEW YORK, April 11, 1906.

During the past week there were some important developments in the machinery trade which will mean the early purchase of large quantities of machinery. In view of the fact that merchants in this territory will probably capture orders for practically all the machinery the most important is the new industrial enterprise which is asking prices on machinery aggregating close to $100,000. In addition to this large inquiry the trade has just received a $25,000 machine tool list from the Southern Pacific Railroad and is figuring on an extensive list sent out by the Wabash Railroad, which covers a large quantity of both metal and wood working machinery. The railroads in the East have been buying considerable in small lots, but have not yet issued the expected lists of machine tools. The absence of heavy Eastern railroad lists for the past few weeks has brought forth the prediction that it will not be long before several of the leading roads will come into the market with extensive machinery specifications. Those in the trade who have been watching it closely say that the New York Central and other large railroads have been holding lists for some time, and for the past few weeks people in the trade have been looking for them. It is thought that they cannot wait much longer as in some instances the lists provide for urgent machinery requirements. A leading machinery man, who has been keeping a line on the proposed expenditures of railroads, made several flying visits this week to a number of shops where it was thought machinery would shortly be required and he declared that before long there will be a strong buying movement among the railroad companies.

Judging from the experience of a well-known manufacturing concern in trying to get early deliveries on some heavy lathes, machine tool men are rushed with business. This company wanted to secure some extra heavy lathes for special service and inquiries were sent out a few weeks ago to a number of companies in that line. Because of some special requirements there were only a few manufacturers able to furnish such machines as were wanted and the would be purchaser was compelled to limit his inquiries to only a few people. Prices submitted suited the inquirer, but in no case was he informed that he could get delivery under a year, and some of those who were asked to bid could not promise delivery under 18 months. Those who have been asking for bids on specially constructed machinery have met with a similar experience in the trade, and it seems to be the disposition of manufacturers to turn down orders of that kind when wanted for early delivery. In the case quoted the purchaser decided to get along as best he could until such time as he could be assured of the delivery in less than six months.

Large Machine Tool Lists.

An important movement is on foot for the establishment of a large plant in this territory for the manufacture of patented automobile fittings and appliances, which it is understood will cost in the neighborhood of $200,000 to complete. The identity of the company is being kept secret, as is also the location for the new plant, and only a few of the names of the gentlemen connected with the enterprise have been made public. Within the past few days a representative of the company has been visiting the machinery trade and getting prices on about $100,000 worth of machinery. Of this amount it is understood that about $40,000 will be spent for automatic machinery alone. From the amount to be expended it will be seen that the project is of large proportions and from the names of some of the gentlemen connected with the new company it would appear that the works will be established without delay. The endeavor on the part of those connected with the company to keep the main facts secret is causing some comment in the trade, but it is expected that publicity will be given the matter very shortly. Among those said to be connected with the company are Colonel Greene, president of the Greene Consolidated Copper Company, one of the Vanderbilts, and Charles D. Cooke, 377 Twelfth avenue, Paterson, N. J. Mr. Cooke's New York address is 654 Hudson street.

The machinery trade is figuring on a fair sized lot of machinery for the Southern Pacific Railroad, which is to be installed at its various shops along the system. The specifications have just been issued and cover machinery aggregating about $25,000 in value, which includes quite a few heavy machine tools.

The Pennsylvania Railroad, through the purchasing agent, is obtaining prices upon much of the material which will enter into the construction of the 1000 new refrigerator cars which will be erected at the Altoona car shops. This is a duplicate of the allotment which were authorized and constructed about this time last year. Prompt delivery of the material is specified, as it is the intention to push the work to early completion. Bids are now being received upon 12 derrick barges, which are steam hoisting, with steel hulls, which is the remainder of the equipment covered by the floating and equipment programme of 1906. It was originally intended to have these barges constructed with wooden hulls, but the increased price of timber made the difference in cost between a wooden and steel hull so little that it was concluded to use steel in the construction of the hull on account of its greater durability, strength and less cost of maintenance. The following tools and machines are wanted by the Pennsylvania Railroad, and prices are now being obtained: One 20-inch screw cutting lathe, one 90-inch chucking lathe, one bolt heading, forging and banding machine, one bolt threading machine and one universal hydraulic flanging press. Superstructures aggregating about 250,000 pounds of steel, are wanted, and plans showing the requirements are being sent to manufacturers.

Bids for a large amount of machinery are now being considered by the Wabash Railroad for the equipment of its new shops to be built at Decatur, Ill., the contract for the construction of which has been awarded to James Stewart & Co., St. Louis, Mo. The cost of the buildings, machinery, grading and yards is estimated at $375,000. The new buildings will be of wood, mill construction, with walls built up of expanded metal plastered with Portland cement mortar, except the power house and large storeroom with office, which will be constructed of brick. There will be a blacksmith and machine shop, 80 x 294 feet; mill shop, 80 x 238 feet; car shop, 88 x 463 feet; power house, 60 x 108 feet; cabinet, tin, glazing, upholstering and electric car shop, 40 x 350 feet; storeroom, oil house, paint shop with two-story office building, 40 x 464 feet, and a number of other smaller buildings. The buildings will be heated with a vacuum steam heating system and lighted by electricity supplied by direct connected dynamos of two 200 horse-power units, using alternating current. Four boilers of the Heine water tube type will be installed and induced draft will be used. The shops will be equipped with modern machinery, which will be operated by individual motors.

Property has been purchased on the water front in Brooklyn at the foot of Twenty-fifth, Twenty-sixth and Twenty-seventh streets by interests allied with the Delaware, Lackawanna & Western Railroad and it is the intention of the company to lay out a large freight terminal at that point. It is proposed to handle import and export freight from the water front at the terminal, and as the tract purchased is a large one it is expected that it will also be put to other uses. The location of the terminal at that point will necessitate the purchasing of considerable conveying machinery, such as is used in loading and unloading vessels, and there will in all probability be a power house and other structures, the equipment of which will require the purchase of machinery. Plans for the terminal have not been prepared as yet, but it is stated that work has already been begun on them.

Other Machinery Requirements.

From all indications the Tennessee Coal, Iron & Railroad Company will soon be in the market for a large amount of machinery equipment for additions to be made to the company's Ensley, Ala., plant. It was stated at the New York office of the company that the directors at the meeting held recently at Birmingham, Ala., decided to about double the plant at Ensley, and it is probable that other extensive additions will be made to the company's holdings. As is known, the company is closely allied with the Republic Iron & Steel Company, and John A. Topping, president of the latter company, has been made chairman of the Tennessee Coal, Iron & Railroad Company's Board of Directors. There is talk among the stockholders of building a new mill at Birmingham, but nothing has been decided as yet along that line, notwithstanding announcements made in the daily papers. The Ensley plant is one of the largest steel plants in that section and some time ago a considerable amount of machinery equipment was purchased and extensive improvements were made there. A good deal of the business at that time was placed in this city. It is understood that it is the intention of the company to go ahead with the Ensley additions as soon as possible and the engineering department there was instructed to prepare plans at once. The proposed additions will meet only existing conditions, as the company is rushed with work, and if business continues to increase as it has it is expected that the new steel mill will be a matter of the very near future. At the directors' meeting there was talk in a general way of the possibility of erecting a plate mill and other steel consuming plants, but that was simply a general discussion as to what might occur in the future and nothing definite was decided upon.

The organization of the Atha Steel Casting Company to take over the business of the firm of Benjamin Atha & Co., at Newark, N. J., will, it is said, result in extensions to the Atha plant. The new company has been organized with an authorized capital of $500,000, and it has been announced that the plant will be expanded to almost twice its present size. Plans are being prepared for a steel and concrete building, to be erected on the site of a frame building now in use. The new building will be about 203 x 209 feet. As was stated in these columns some time ago, three 25-ton furnaces are being installed in the plant at present, but the plans, it is said, include further extensions. No information as to just how large the extensions will be can be obtained as yet beyond that it is expected that the plant will be doubled eventually. Heretofore orders for machinery equip-

ment and the like have been placed by the company at the plant at Newark, and when purchases for the proposed additions are made it is expected that trade in this vicinity will benefit.

A steel car plant which will call for heavy expenditures for machinery and other equipment is to be erected at St. Louis by the American Car & Foundry Company, which has selected a site there on Levee and First streets, between George and Lynch streets. The engineering department of the company at St. Louis is now busily engaged preparing plans for a large plant, which will be practically an adjunct to the South St. Louis car manufactory. It is expected that the new plant will cost $1,000,000. The site which has been acquired by the company is 300 x 1200 feet, and it is expected that it will be entirely occupied by the buildings. So far plans have been completed only for the main building, which is to be constructed of steel and will be about 180 x 800 feet. It is said that the new plant will employ about 1500 men and it will be used almost exclusively, according to present plans, for the manufacture of steel cars. It is understood that work will be commenced this summer and it is thought that the plant will be completed by fall. Accordingly the company will shortly come into the market for the necessary equipment, none of which has been purchased as yet. It is being realized more and more that the wooden cars now in use on most surface railroads will soon give way to the steel cars introduced when subway travel was inaugurated in New York. In this connection it is persistently rumored that the Pullman Company is preparing to go into the manufacture of steel cars, and although it is said by the Pullman interests that no plans are contemplated for the present indications are that it will have to adopt steel cars in order to compete with its rivals. It may be safely stated that other car builders will shortly take up the construction of steel cars, and it is promised that this practically new branch of the car building industry will give the trade much to do in all lines of machinery equipment.

The Delaware Hard Fibre Company, Wilmington, Del., has purchased the old rolling mill property at Marshallton, Del., and will begin the erection of a new mill on the site within a few weeks, for the manufacture of paper and hard fiber. The mill will be operated by steam power of about 400 horse-power and the electric light plant will be driven by water power. The machinery required for the mill will consist of boiler capacity of 400 horse-power, one 50 and one 300 horse-power engine, the usual equipment of paper mill machinery and a quantity of special machinery.

The Revolute Machine Company has been organized with $30,000 capital stock, to succeed the firm of Everett & McAdam, manufacturers of blue print machinery, 346 Broadway, New York. The firm has been having its machines made by other companies, but now it intends to install a plant of its own at 517 West street, New York. The plant will be equipped for the manufacture of special machines on which the company has patents and small sized drills, drill presses, lathes and similar machinery will be purchased. The company will not install its own power as yet. The incorporators of the new company are J. V. McAdam, C. J. Everett and F. A. Wagner, all of New York.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, have been purchasing some equipment for a power house that the company is installing for the New York, New Haven & Hartford Railroad at Cos Cob, Conn. The New York office of the Case Mfg. Company, 85 Liberty street, has secured an order for the plant for a 35-ton, 60-foot span, 5-motor electric traveling crane, with two trolleys of 17½ tons capacity each. The equipment is being purchased by C. M. Chapman.

The firm of F. & J. Myer, 230 Front street, New York, is receiving bids on several 150 horse-power compound vertical engines. These machines are intended for export and the orders are to be closed shortly.

J. G. White & Co., Limited, the London connection of J. G. White & Co., 43 Exchange place, New York, has secured part of the contract for the construction and electrification of the Northern Tramway system which was advertised by the London Council. The section of the system to be electrified amounts to about 22½ miles of single track, and the remainder of the contract was awarded to Dick, Kerr & Co., Limited. J. G. White & Co. will have about $710,000 worth of work and the section to be constructed will be between Shoreditch and Stamford Hill. While it is not known as yet whether American machinery will be imported for the system, it is understood that no stipulation was made in the advertisement as to the exclusive use of English material. J. G. White & Co. have purchased considerable machinery equipment in this country of late for export, especially for work in Canada and the South American countries, and it is highly probable that some branches of the trade in this country will be benefited, as there are some lines of electrical equipment where it is conceded that American material excels.

Business Changes.

The Pittsburgh offices of the Niles-Bement-Pond Company have been moved to 713 and 714 Frick Building.

The New York offices of Takata & Co., the Japanese firm whose engineering department has placed a great deal of business with the machinery trade here for export, has been moved from 10 Wall street to 60 Wall street.

Catalogues Wanted.—The Gates Company, Midland, Mich., desires catalogues of mining and ore machinery, conveyors, elevators, dumping cars, pipe fittings and general power transmission machinery.

New England Machinery Market.

WORCESTER, MASS., April 10, 1906.

The demand for machine tools continues without abatement and the same condition is true in all lines of machinery, including power equipment of various sorts. The engine and boiler builders are as busy as ever and the indication is that there will be no cessation to their great prosperity for a long time to come. Pumps of all descriptions are in strong demand. There is a good deal of buying of combustion engines, both gasoline and kerosene, for farm purposes and for marine use, both in pleasure boats and in fishing and other commercial craft. The range of usefulness of this class of motor is constantly growing, which accounts for some of the increased demand, but the general prosperity among the farmers and along the coast is generally credited with the larger share of present conditions.

No formal programme of business to come before the meeting of the National Machine Tool Builders' Association will be sent out by Secretary Montanus. As no specific topic of importance has been arranged for, or known to be imminent, there is no purpose in notifying members. The convention, as stated, will be held at Atlantic City, Tuesday and Wednesday, May 1 and 2, at the Chalfonte. President E. M. Woodward, Worcester, Mass., and Secretary Paul E. Montanus, Springfield, Ill., will arrive at the Chalfonte on Monday evening, in order that full preliminary arrangements may be made to facilitate the work of the first day's session, which will probably be devoted to committee work by the various sections of the association. It is already assured that the attendance will be large. New England's delegation will be especially strong, it is stated. President Woodward has invited the committee of the National Supply and Machinery Dealers' Association to be present at Atlantic City during the convention to participate in the social side of the gathering.

There appears to be a strong chance that the matter of a further increase in prices of machine tools will come before the association at this meeting. There is a feeling among some of the members that the advance made last fall is not large enough. At the time there was a strong faction in favor of a 10 per cent. advance, but it was finally decided that a new schedule increasing prices about 5 per cent. was more expedient and such was the vote of the association. Since early December, when the special meeting was held at New York, the prices of raw materials have advanced appreciably, including castings. The 5 per cent. was not enough to make up for the previous advance of raw materials and of wages of employees. Possibly the price of coal may enter in this question. Altogether certain members advocate a second advance of 5 per cent, making the total 10 per cent. The demand would justify the advance, for every manufacturer of machine tools is taking orders faster than his rate of production, and even if a higher price might mean a slight falling off in demand it would hardly be felt. Probably it would make no difference in the market so keen is the desire of users of machine tools to increase their manufacturing facilities.

The continued scarcity of skilled labor is demonstrated in statements made the past week by the labor bureaus at Springfield and Worcester, Mass. The *Bulletin* of the Worcester Metal Trades Association contains this paragraph: "We find it impossible to readily satisfy the demand for skilled help which the employers desire. If you should not get the men you require as quickly as formerly we trust you will bear with us, as every means is being taken to get the men you want. The demand for skilled labor in other cities is the same as in Worcester; therefore it is no advantage for us to go elsewhere to attempt to procure men." The *Weekly Letter* of the Connecticut Valley Metal Trades Association states: "There continues to be a great scarcity of skilled help in this general section. It is very difficult to induce men to change from other cities as they ask prohibitive rates. It often happens that we have to send you men that are not as good workmen as could be desired, with the hope that you can break them in. Whenever possible we send what you ask for, but if we can't do that we do the best we can under the circumstances." These two statements voice conditions in every part of New England where metal is worked.

The Canadian Pacific Railroad contemplates an important extension to its system, connecting Debec Junction, New Brunswick, with Mattawamkeag, Maine, a distance of some 50 miles as the crow flies. The new line will connect two divisions of the company's system. It is reported that surveyors have completed their work, having decided upon the best location.

It looks as if the new repair shops of the Boston &

Maine Railroad referred to in this column several weeks ago are nearer fulfillment than has been generally supposed by those not immediately connected with the active management. The engineering department is about to begin the preparation of plans for great shops to be located in the city of Somerville, a suburb of Boston, where land for the purpose was acquired several years ago. While no definite knowledge of the capacity of the shops is obtainable, it is known that they are to be very large and will embrace facilities for the repair of both locomotives and cars. The cost is believed to be largely in excess of $1,000,000, of which a very considerable part will be for machine equipment. The present repair shops of the Boston & Maine are old and scattered over the large system. Probably little if any present equipment will be available for the purposes of the new shops. Moreover, it is understood that the intention is not to abandon present repair shops, though it is to be presumed that their capacity will be reduced in actual practice, excepting during times of emergency. At the present time the facilities for keeping the company's rolling stock in repair are very meager. This has been especially true since large additions were made of both locomotives and cars. Consequently the newly decided project will doubtless be pushed, and the promise is that work will begin in the summer and preliminary work on the Somerville site even earlier. The land is known as the "Dirty Marshes" and is located on the western division of the Boston & Maine and also on the Mystic River, which will provide tidewater facilities. The funds to meet the expense of the new shops will be provided in a new issue of stock.

E. D. Crockett, recently with Fay & Scott, Dexter, Maine, has formed a connection with the Boston office of the Prentiss Tool & Supply Company as a salesman. He will cover New England north of Massachusetts.

The New York, New Haven & Hartford Railroad has announced a decrease in the freight rates on coal of 10 cents a ton. Local freight agents of the company state that the decrease will not be universal throughout the company's system, but is rather in the nature of an equalizing of rates, favoring smaller and more remote places rather than the important centers. Worcester, for instance, will reap no benefit from the reduction, the rate of 85 cents a ton from tidewater points being maintained. But smaller manufacturing centers will be the gainers, 10 cents a ton being a considerable decrease in many instances. Naturally tidewater points will not be affected, as the change relates only to rates from coast points where the New Haven road maintains coaling docks. Dealers will share results of the change with manufacturers and other large consumers. Some of the larger consumers of coal among the manufacturers in inland places have abandoned dependence upon water shipments, all fuel being carried by all rail routes. Notable among these instances are the Worcester Works of the American Steel & Wire Company which formerly maintained a considerable fleet of schooners. It was found that water rates varied so materially that prices were so high at times that coupled with expense of handling and of rail rates from tidewater the cost was higher on the average than all rail rates.

It is stated that the Boston & Albany division of the New York Central Railroad has curtailed production at its several repair shops, owing to the fact that there is less demand for rolling stock because of the coal strike. Considering that the demands on the freight facilities of this system, apart from coal, are exceedingly heavy, it is not believed that this new condition at the shops will be more than temporary.

During the past week labor troubles in New England have dwindled by the settlement of several small differences, the men going back to work. Nothing new has developed which would indicate an increase of discontent on the part of employees.

Much interest is manifested in rumors that the New York, New Haven & Hartford Railroad is seeking to acquire control of the street railway systems of Worcester, Mass., and vicinity and of Providence, R. I., and its neighboring towns and cities. It is known that some outside interest has been securing stock of the Worcester Consolidated Street Railway Company and it is presumed that a majority is in the hands of new owners. The stock of the Rhode Island company, which controls a great system, with Providence as its center, has also been moving in such a manner as to indicate a probable change in control. With the New Haven road in control of most of the street railways of Connecticut and western Massachusetts, the acquiring of the Providence and Worcester systems would have an important meaning to the future of the railways of these sections.

The H. A. Adams Tool Company, Hartford, Conn., is a new Connecticut corporation organized to manufacture special machinery, machinist tools, model and gauge work, advertising machines and hardware specialties. The Cox mill in East Hartford has been acquired by the company and will be equipped for manufacturing. Ample water power is available to furnish power. The company is capitalized for $100,000, of which $40,000 will be issued at this time. Harry A. Adams, the president and superintendent, has been for several years associated with the Fox Typewriter Company, Grand Rapids, Mich.

The Wheeler & Wilson Mfg. Company, Bridgeport, Conn., manufacturer of sewing machines, has decided to establish a central power station, concentrating the power for all departments in one building, plans for which are now being prepared. Contracts for the power equipment have been placed.

The Brown & Sharpe Mfg. Company, Providence, R. I., is to add a story to its large office building to procure increased space for this department of the business. No other new building is contemplated for this season. Enlargements begun last year are extensive, greatly increasing the company's manufacturing facilities.

Philadelphia Machinery Market.

PHILADELPHIA, PA., April 10, 1906.

Orders for both machinery and machine tools have been placed in greater quantity during the past week and a good run of business would no doubt develop were it not for the continued uncertainty as to the probability of an anthracite coal miners' strike. That situation, however, is thought by many to be clearing itself, and it is now confidently expected that the differences will be amicably adjusted. Still there remains a chance that an agreement between the operators and their employees may not be reached, as expected, and because of that possibility many would-be purchasers are deferring the final placing of their orders.

Inquiries are better. Several medium-sized lots of tools, mostly for equipment to additions of present plants, are before the trade, as are also requirements covering heavy tools for some of the large nearby steel and iron mills, the latter being confined mostly to a few tools in the respective cases. The specifications for the equipment of the Seaboard Air Line's new shops at Jacksonville, Fla., are being figured on by some of the trade, and with the day-to-day demand holding well up to the average, the outlook for a very nice spring business is considered to be very satisfactory.

There has been a better demand for tools of the heavier types during the past few weeks, and orders for a number of large lathes, presses and special tools have been booked by both dealers and manufacturers.

Tool builders continue very busy, while orders already in hand have been sufficient to keep them well occupied; the amount of day-to-day business received has been so large that it has been impossible for them to catch up to any extent on deliveries. In some cases shipments are still further deferred and definite dates of delivery on new business, particularly for heavy tools, are being refused by some makers.

Foreign demand does not appear to be gaining any in strength. A few orders for tools, mostly those of a special character, have been placed, but no business of moment has been transacted in the general line of tools. Orders for pulleys, hangers and other power transmission specialties have increased.

There is a fairly good demand for boilers and engines in this territory, both for those of the medium and higher powers. Dealers in second-hand engines and boilers report a good demand for the medium powers, while the sales of second-hand machinery have been quite numerous, particularly for those of the heavier types.

Both steel and gray iron foundries continue to receive a large volume of business. Steel casting plants find it difficult to furnish castings as promptly as customers desire, and a number of builders of tools complain of this delay. Gray iron castings are in better supply; the various local foundries are now producing practically their complete tonnage capacity and are booking a good quantity of orders.

The Dix Mfg. Company, Baltimore, Md., is building a new plant, located on Guilford avenue near Eager street, in that city, for the manufacture of door hangers. The company will be in the market for additional equipment for its new plant, including among other things, punching presses, drill presses and electric motors.

The H. I. Du Pont Powder Company, Wilmington, Del., has had plans prepared by James B. Ladd, engineer, Philadelphia, for a two-story dry kiln building and two-story annexes. The kiln building will be 60 x 129 feet, and contain ten drying tunnels, the annexes containing the heaters and blowers and other special machinery for manufacturing purposes. While these latter have been designed by the above engineer, purchases will be made by the company direct.

The Department of Public Health and Charities of the city of Philadelphia will receive sealed proposals until April 16, at noon, for the installation of steam boilers, engine and steel stack, together with laundry apparatus, in the laundry building department of the insane, Philadelphia Hospital, Thirty-fourth and Pine streets. Plans and specifications can be seen and forms for bidding obtained at the office of W. B. Powell, architect, room 825, City Hall.

The Birdsboro Steel Foundry & Machine Company is busy in all departments. Inquiries and orders for both rough and finished work are in good volume and bid fair to continue so for several months at least. Some of the recent

orders received include hydraulic machinery, mill tables, Wagner cold saws and a miscellaneous line of open hearth steel castings, among which are a number of high pressure steam fittings and centrifugal pump castings. This company has recently made additions to its power equipment and boiler capacity, representing an increase of 100 per cent. in the power efficiency of the plant. The pattern shop is now being equipped with the most improved type of wood working machinery to facilitate the handling of the increased business in that department.

The Espen-Lucas Machine Works notes a continual improvement in the demand for cold saw cutting off machines. Inquiries and orders have increased and a large amount of work for various customers is on the books. Deliveries recently have been quite heavy and include, among others, several 40-inch steel foundry saws for nearby delivery; two crank shaft forming machines, one for parties in New York State, the other being shipped to a New York City customer; a large floor boring, milling and drilling machine to a Western party and structural and bar saws to purchasers in various sections of the Middle Atlantic and Western States.

The Newton Machine Tool Works notes a good demand for its various lines of tools, particularly for rotary planers, cold saw cutting off machinery and for slotting machines. Orders have been in good number and all departments of the plant are working at their full capacity. A slight increase in the foreign demand is also to be noted. Orders for several tools have been received and recent deliveries on this account include a large portable boring machine for export to England, a heavy slab milling machine to Peru, and a number of Keyseat milling machines to customers in different countries. Domestic deliveries include a number of slab milling machines, both vertical and horizontal types, for several large electric companies; steel foundry saws, ranging from No. 0 to No. 2, and slotting machines, ranging from 8 to 20 inches, for customers in various parts of the country. Rotary planing machines from 36 to 48 inches have also been shipped to a number of structural iron works.

The Baldwin Locomotive Works is operating to the full capacity of its plant. Orders recently booked include one for 100 engines for the Pennsylvania Railroad. These will be of the heavy freight type and are to be delivered at the rate of 25 per month in July, August, September and October. This order makes a total of 300 locomotives from the Baldwin Works by the Pennsylvania Railroad for delivery during 1906. Orders have also been received for a large number of single engines for various industrial concerns for this year's delivery, while reservations have been made for large orders from different railroad companies for engines to be delivered in 1907. The foreign demand for locomotives has not been very heavy. A few orders for export, however, are now on the books.

H. B. Underwood & Co. have recently booked a number of good orders for their line of portable shop repair tools, including rotary planing machines, cylinder boring bars, crank pin turning machines and portable engines, from Southern and nearby railroads, as well as for use in general shop practice. A special portable boring machine was also ordered by parties in Louisiana for boring cylinders of cotton presses. A good volume of inquiries is being received by this firm and all departments of its plant are being operated at full capacity.

Cincinnati Machinery Market.

CINCINNATI, OHIO, April 10, 1906.

The past week has shown no retrograde movement in the demand for machine tools and all of the builders are crowded with work. As one prominent manufacturer expresses it, "the situation is a very embarrassing one, as much so perhaps with the inability of the plants to make prompt deliveries as would be the case were conditions reversed and new business hard to obtain." All of the shops without exception have their order books fully covered for several months and the general forecast for the year is that it will be phenomenal in the way of business done.

There is a very apparent shortage in the way of skilled machinists, and lathe, planer, grinder, vise and drill press hands are in demand. This shortage is partly attributable to the fact that several of the larger concerns are working a night shift in order to keep delays in deliveries down to a minimum, and they inform us that it is almost an impossibility to secure a sufficient force to make this proposition a success.

Considerable excitement and numerous comments have been extant in regard to the Littauer bill now pending before the House Committee on Coinage, Weights and Measures, of which James H. Southard of Ohio is chairman, and which has for its primary object the compulsory adoption of the metric system of weights and measures in all departments of of Government. The machine tool builders are a unit in opposing the passage of this bill, as it will work considerable hardships upon them in various ways. F. A. Geier, president of the Cincinnati Milling Machine Company, who has given much time and thought to this bill, and is well informed on matters of this kind, in response to a query as to his views, expressed himself as follows: "The friends of the bill, among whom the chairman of the Coinage Committee must be ranked as the foremost, have insisted all along that there was no intention that the bill should in any way affect manufacturers or the common people. This claim is of course ridiculous when we consider the thousands of people who are doing business directly with the Government and who if the bill were passed would have to conform to the metric system of weights and measures, and through whom tens of thousands of others would be affected in the same way. Besides, Mr. Littauer, who introduced this bill, stated in his testimony before the committee some days since that it is his plan that the present bill should form the entering wedge for bringing about the universal use of the metric system in America. The chairman of the committee during recent hearings also admitted that the introduction of the metric system would not drive out our present system, but that manufacturers would be obliged to use both. These two points being conceded by the friends of the bill, we can pass on to the question of its direct and ultimate results on the manufacturing interests of the country. In view of the fact that manufacturing is done entirely in accordance with fixed and selected standards, and since these standards are widely different when different systems of measurements are being used, it is at once evident that it is not possible to go on (as the chairman of the committee has so often maintained) and use our present standards by simply calling them by their metric equivalents. Take for example milling machine arbors. In American practice we have selected certain sizes as being the most convenient and useful, among which are ⅞, 1, 1¼ and 1½ inch. Milling cutters are made with holes to correspond with these dimensions. In metric countries, when metric milling cutters and arbors are used, the standards are 22 mm., 27 mm., 32 mm., 38 mm., and so on, not one of which could be substituted for the nearest size of an American or English arbor. The fact is they have selected for standards sizes best suited to their system, while we have selected for our standard sizes best suited to our system. The two systems cannot in any manner be reconciled with each other. It is therefore clear that a shop using both systems would be obliged to carry complete duplicate sets of all drawings, patterns, jigs, fixtures, standard and special gauges, small tools, templets, and furthermore be required to make many changes in its machine tools. Besides, if the business were split up into part metric and part English we would not be able to manufacture duplicate parts in the same large quantities when doing the same volume of business as at present, so that there would be considerable loss to the manufacturer on this account. A very conservative estimate of the expense that would be involved in all this places the amount at one-fourth of the entire working capital of a well organized machine shop. It has not been shown that anything would be gained by making the changes, as we could not make more machines, we could not make better machines, nor could we sell more of them. In other words, there would be absolutely no opportunity to get back anything for the money spent in bringing about the change, and the amount involved is so great that it would be ruinous. The manufacturer is not the only one who would be affected. Every machinist would be obliged to equip himself with new scales, protractors, micrometer calipers and similar tools. Nor does it end here, but a similar proportionate expenditure would have to be made by every craftsman; even the carpenter would be obliged to have new squares, new rules, &c. Ultimately, every one would be obliged to make an expenditure of money for which he would receive no returns whatever. The only class of people who would be benefited by the use of this system are those engaged in computations scientific and abstract; the astronomer, pure scientist and mathematician, also in practical life the pharmacist, the chemist, and allied professions. But these people are already using the metric system under the privilege granted by the statute of 1866, which made the use of the metric system legal in the United States. These people have found it to be a good thing for them and they have taken it up. Men engaged in the mechanical arts have found that it would not be a good thing for them and consequently have not taken it up. After being legal for 40 years, this system has not found its way into the mechanical industries of the country on its own merits, and any law that would either directly or indirectly force the manufacturers into this would amount practically to Government confiscation of about one-fourth of our working capital."

The Cincinnati Lathe & Tool Company is now in successful operation at 2730-2732 Spring Grove avenue. It builds 16-inch lathes with compound rest, and the W. T. Emmers' patent feed device. Foreign inquiry is reported to be excellent, and several large orders are in prospect from this source. Trade from domestic sources is good, and the new company is beginning its fiscal year under very auspicious circumstances.

The Bickford Drill & Tool Company is far behind in its orders, and new work is developing in a manner that is simply wonderful. Several new tools that were placed on the market some weeks since have proved to be ready sellers, and the results have been very satisfactory.

The Cincinnati Milling Machine Company says that the month of March was the largest in the way of manufacture and sales since the establishing of the concern. A night shift is being worked in order to take care of the ever growing trade, but a great amount of trouble is experienced in securing enough of the right kind of men to successfully accomplish it. Lathe hands, planer, grinder, vise and drill pressmen are needed badly, and can be given almost unlimited employment.

Government Purchases.

WASHINGTON. D. C., April 10, 1906.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 24 for a quantity of supplies for the Eastern navy yards, including steam pumps and hydraulic jacks.

The Department of the Interior, Washington, D. C., will receive bids until May 28 for a new electric plant to be installed near Garden City, Kan., and to be of 450 kw. capacity. The plant is to be used for pumping purposes and there will be required boilers, engines, generators, &c.

The following bids were opened April 3 for supplies for the navy yards:

Bidder 4, American Ship Windlass Company, Providence, R. I.; 23, George F. Blake Mfg. Company, New York; 39, Wm. Wirt Clark & Son, Baltimore, Md.; 45, A. S. Cameron Steam Pump Works, New York; 55, M. I. Davidson, Brooklyn, N. Y.; 57, Dyer Bros., San Francisco, Cal.; 72, Fore River Ship Building Company, Quincy, Mass.; 73, Fairbanks Company, New York; 82, Garvin Machine Company, New York; 89, Hendey Machine Company, Torrington, Conn.; 101, Hyde Windlass Company, Bath, Maine; 102, Hill, Clarke & Co., Boston, Mass.; 103, Henshaw, Bulkley & Co., San Francisco, Cal.; 107, Harron, Ricker & McCone, San Francisco, Cal.; 108, Handlan-Buck Mfg. Company, St. Louis, Mo.; 110, Iroquois Iron Works, Philadelphia, Pa.; 131, Manning, Maxwell & Moore, New York; 133, Monad Engineering Company, New York; 139, Motley, Green & Co., New York; 145, Municipal Engineering & Contracting Company, Chicago, Ill.; 153, Niles-Bement-Pond Company, New York; 172, Pacific Tool & Supply Company, San Francisco, Cal.; 176, Ricketts Engineering Company, Washington, D. C.; 203, Snow Steam Pump Works, New York; 209, George C. Thomas, New York; 220, James M. Vance & Co., Philadelphia, Pa.; 223, Vermilye & Power, New York; 224, Wellman-Seaver-Morgan Company, Cleveland, Ohio; 239, Williamson Bros. Company, Philadelphia, Pa.

Schedule No. 399.

Class 11. One belt driven shaper—Bidder 73, $385; 82, $300; 102, $328; 131, $375 and $430; 153, $284 and $325; 57, $698.75 and $487.50; 176, $380.

Class 12. One concrete mixer—Bidder 39, $1132; 108, $1125; 110, $1849; 131, $875; 139, $1420 and $1053; 145, $1163.50; 176, $1282 and $950; 209, $1272; 223, $1149.

Schedule No. 400.

Class 21. One duplex piston pattern brass fitted condenser circulating pump—Canceled.

Class 22. One locomotive gantry crane—Bidder 133, $17,524; 224, $16,600.

Schedule No. 401.

Class 31. One new model 14-inch swing, 6-foot bed, 36-inch centers, gibbed, carriage engine lathe—Bidder 82, $846; 89, $690; 153, $765 and $800.

Schedule No. 402.

Class 41. One cutting off machine—Bidder 102, $917.

Class 42. One turbine engine, with auxiliaries and water tube boiler—Bidder 72, $11,280.

Schedule No. 404.

Class 61. One universal tool and cutter grinder—Bidder 103, $526; 107, $347; 108, $300; 131, $865; 172, $630.

Schedule No. 424.

Class 243. Two steam winches—Bidder 4, $700, $750, $800, $760, $820 and $880; 101, $900; 239, $950.

Schedule No. 425.

Class 273. One pressure pump—Bidder 55, $1620; 203, $683.25; 235, $875.

Class 274. Fourteen steam launch pumps—Bidder 23, $686; 45, $700; 55, $630; 220, $854.

The following bids were opened March 31 for machinery for the power plant for the New York Navy Yard:

Thomas & Smith, Chicago, Ill., item 1, $132,907; 2, $135,002; 3, $131,105; 4, $133,207; 5, $8000, deduct *a;* $7300, deduct *b;* $1000, deduct *c;* $5500, deduct *d;* $5000, deduct *e.*

The Scofield Company, Philadelphia, Pa., item 1, $158,957; 2, $161,308; 3, $158,593; 4, $160,941.

Blake & Williams, New York, item 1, $145,000; 2, $147,500; 3, $143,000; 4, $145,500; 5, $141,000, *f;* $138,400, *g;* $142,000, *h.*

A. D. Granger Company, New York, item 1, $128,740; 5, $800, deduct *i;* $1100, deduct *k;* $500, deduct *l.*

Evans, Almiral & Co., New York, item 1, $127,295; 2, $129,307; 3, $126,073; 4, $128,126; 5, $121,250, *m;* $120,000, *n;* $116,295, *o;* $115,000, *p.*

M. W. Kellogg Company, New York, item 1, $137,425; 2, $139,707; 3, $135,643; 4, $137,920; 5, $125,852, *q;* $124,828 *r.*

E. Rutzler Company, New York, item 1, $133,355; 2, $135,330; 3, $131,733; 4, $133,806; 5, $119,361, *s;* $118,041, *t;* add $5000, *u.*

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has been awarded contract for the gantry crane for the Isthmian Canal Commission at $21,920, under opening of January 2, circular No. 293.

The following awards have been made for machinery for the navy yards, bids for which were opened March 6:

Manning, Maxwell & Moore, New York, class 11, two 800-pound double frame steam drop hammers, suitable for drop forge frame, $2200; class 12, two 2000-pound steam drop hammers, $4200.

Becker-Brainard Milling Machine Company, Hyde Park, Mass., class 20, two vertical milling machines, with 20-inch rotary table, $1448; class 21, two vertical milling machines, with 27¾-inch rotary tables, $2844.

Under bids opened March 20 for supplies for the navy yards the following awards have been made:

Manning, Maxwell & Moore, New York, class 4, three electrically driven dry emery grinders, $786; class 7, one pipe bending machine, $124.

Brown & Sharpe Mfg. Company, Providence, R. I., class 5, one No. 2 cutter grinding machine, motor driven, $371.

Ricketts Engineering Company, Washington, D. C., class 8, one motor driven two-piece crank shaper, $834.

Under bids opened March 27 for supplies for the navy yards Manning, Maxwell & Moore, New York, have been awarded class 13, one compound lever and pinion slitting shear, $33.30; class 14, one compound lever and pinion gap shear, $33.30.

Handlan-Buck Mfg. Company, St. Louis, Mo., class 12, one pipe bending machine, $130.

Trade Publications.

Steam Specialties.—Crane Company, Chicago. Advance circulars, Nos. 1 to 20. No. 1 deals with the Crane steam and oil separators, the live steam separator being suitable for working pressures up to 250 pounds, and the oil separators suitable for vacuum or free exhaust. No. 2 deals with the Crane butterfly hot water radiator valves; No. 3, with the perfection easy cutting pipe dies, sectional and solid; No. 4, with a renewable spring disk brass valve; No. 5, with a combination back pressure and exhaust relief valve, made in horizontal, vertical and angle patterns, suitable for condensing or noncondensing engines; No. 6, with extra heavy flanged pipe joints with swivel flanges, suitable for working pressures up to 250 pounds; No. 7, with flanged pipe joints, giving a brief treatise concerning the merits of the various styles of joints used in attaching flanges to wrought pipe; No. 8, with exhaust relief valves, made in horizontal, vertical and angle patterns, suitable for reciprocating or turbine engines operating condensing only; No. 9, with flanged pipe joints with wrought steel flanges welded on, suitable for working pressures up to 250 pounds; No. 10, with reversible stop and waste cocks tested to 200 pounds hydraulic pressure; No. 11, with brackets, hangers, supports, rolls and anchors for supporting steam and hydraulic pipe lines; No. 12, with nonreturn and direct return steam traps. The nonreturn steam traps will work at any pressure from 1 to 250 pounds. The direct return steam traps will work against any pressure from 1 to 250 pounds, and under any vacuum up to 29 inches. No. 14 deals with expansion joints balanced, unbalanced and swivel. The low pressure joints are suitable for working pressures up to 50 pounds; the standard are suitable for working pressures up to 125 pounds, and the extra heavy for working pressures up to 250 pounds. No. 15 deals with Crane drip pockets made from cast iron or ferrosteel. The standard drip pockets are suitable for working pressures up to 125 pounds; extra heavy drip pockets are suitable for working pressures up to 250 pounds. No. 17 pertains to quick opening hot water radiator valves; No. 18 to automatic and emergency valves operated by steam, electricity, water or air, and suitable for pressures up to 250 pounds. No. 19 is concerned with sediment traps for use in connection with steam traps, pump suctions, feed water lines, water meters, &c., for pressures up to 250 pounds. Advance circular No. 20 deals with Crane pipe bends made from wrought steel pipe, suitable for working pressures up to 250 pounds.

Valves.—The D. T. Williams Valve Company, Cincinnati, Ohio. Illustrated catalogue. Revised to date, superseding all previous issues. The line is now very complete and embraces regrinding globe, angle and cross valves, with screw or flange ends; blow off and check valves, gate valves and unions. In addition to valves the following articles are listed: Oil cups, water gauges, grease cups, Cookson separators, vertical and horizontal patterns, Cookson steam traps and Cookson oil separators.

Complete Power Plants.—A. D. Granger Company, 95 Liberty street, New York. Bulletin No. 3. Sets forth the ad-

vantages of placing contracts for complete power plans with one concern and calls attention to this company's facilities. An outline is given of the varied lines of machinery handled by this company. Illustrations show samples of work which has been undertaken in the past. The company undertakes everything in the equipment of a complete power plant, including steam and electrical transmission, for industrial and manufacturing projects, hotels, office buildings, apartment houses, central stations and isolated lighting and power installations.

Work Railways.—Arthur Koppel Company, 66 Broad street, New York. Catalogue No. 111. This is a revised and condensed catalogue of narrow gauge and standard gauge railway material, including rails, steel ties, switches, turntables, steel and wood cars and accessory equipment of every character. Many different forms of cars are shown, such as dump cars, cars for coal and ash handling; mine, coal and ore cars: flat, gondola and box cars; truck and lumber cars; hopper cars; brick cars, and cars for iron and steel handling, including ladle cars. Several different forms of buckets are also shown, and a few illustrations show actual equipment in use.

Gas Engines.—The Motor Engine Company, 15 William street, New York. Catalogue. Contains quite an extensive discussion of the principles of gas engine design, comparing the advantages and limitations of the four-cyle and two-cycle types. The Hudson gas and gasoline engines described are of the two-cycle type, in which the compression takes place in a separate chamber instead of in the crank case. The engines also do away with the trunk piston. They are made in single and double cylinder form, in sizes of from 5 to 40 horse-power. The mechanical construction is described in detail.

Pattern Letters.—A. Everett & Son, Auburn, N. Y. Price-list. Covers white metal and brass pattern letters and figures, pew and door numbers, machinery name plates, steel letters, figures and stamps, copper brands, &c. The latter part deals with leather and wood fillets, dowel pins, stencils, &c.

Turbine Pumps.—Tacony Iron Company, 713 Chestnut street, Philadelphia, Pa. Catalogue H. T. No. 2. Gives a brief presentation of the features of the Franklin turbine house tank pump, intended for house tank supply, pump pit drainage and all other domestic service. Illustrations show it in connection with an electric motor on a single base. It is made in sizes requiring from ½ to 2 horse-power to drive. Larger pumps are made for service requiring higher capacity.

Portable Oil Engine.—De La Vergne Machine Company, East 138th street, New York. Contractors' power bulletin. Contains several illustrations of contractors' portable outfits for operating compressors, hoists, &c.

Sidewalk and Vault Lights.—Berger Mfg. Company, Canton, Ohio. Catalogue. Size, 9 x 12 inches. This is a complete catalogue of Berger's perfection luminous sidewalk and vault light system for sidewalks, vaults, floors, areaways, skylights, &c. It consists largely of illustrations and gives a very clear idea of the many features and different possibilities of the construction.

Industrial Railways.—C. W. Hunt Company, West New Brighton, Staten Island, N. Y. Catalogue No. 0511; size, 6¾ x 9¼ inches; pages, 64. This catalogue contains a very comprehensive treatment of narrow gauge railway equipment, known under the trade name of "Industrial Railway," for the handling of raw, partly finished or finished product in all lines of manufacture. Everything is embodied, from track, crossings, turntables, curves, &c., to all kinds of rolling stock. Tracks are furnished for laying in dirt, concrete floors or any other situation, and cars are made for handling all kinds of general or special materials. Electric locomotives are shown, crane cars, rail cars and kindred pieces of special apparatus. Among the special purpose cars are charging cars for foundries, foundry ladle cars, gas coke cars, many kinds of dumping cars, &c.

Electric Motor Controlling Devices.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Loose leaf bulletins, superseding former bulletins of same number. No. 24 deals with compound starting and regulating rheostats, with under-load release. No. 25 concerns the same with under-load and over-load release. No. 67 A-I contains dimensions of nonreversible drums. No. 75 deals with nonreversible machine tool controllers of the slate front type; No. 76, full reverse machine tool controllers, slate front type; No. 77, compound nonreversible machine tool controllers; No. 77 B, dimensions of the same; No. 78, compound full reverse machine tool controllers; 78 B, dimensions of same, and No. 79, compound resistance and list prices.

Induction Motors.—Emerson Electric Mfg. Company, St. Louis, Mo. Bulletin No. 3108. Contains descriptions, illustrations, specifications and price-list of single phase induction motors, class 28 B A, 1-10 and ⅛ horse-power, condensed type, full load automatic start.

Lifting Jack.—The Duff Mfg. Company, Pittsburgh, Pa. Pamphlet entitled "Frenzied Jack-Sense." Contains an amusing bit of humorous verse advertising the Barrett track and car jack.

Air Compressors.—Bury Compressor Company, Erie, Pa. Bulletin No. 30. Describes and illustrates various types of duplex and compound air compressors, steam and belt driven. Specification tables for each class are given, and the last few pages deal with air receivers.

CONTENTS.

PAGE.

Allis-Chalmers Extensions. Illustrated....1245
The Coates Grinding Attachment. Illustrated....1248
A Steam Turbine in Siam....1248
The Eurema Y Valve. Illustrated....1249
The Champion Electric Blacksmith Blower. Illustrated...1249
British Tube Combine Halted....1250
Rolling Mill Drive Construction. Illustrated....1250
The Long Island City Power Station.—II. Illustrated....1254
The Mossberg Pull Countershafts. Illustrated....1258
The Ratio of Copper and Pig Iron Consumption....1259
Niagara Conditions from the Canadian Viewpoint....1259
The Kuderer Mine Ventilator. Illustrated....1260
The Brown Recording Revolution Indicator. Illustrated...1261
A Duquesne Blast Furnace Record....1261
The Pennsylvania Railroad's Ore Dock at Buffalo....1261
Galvanized Wire Fencing for Railroads....1262
Consular Service Improvement....1263
Piping in Steel Ingots....1263
A Planer Leveling Device. Illustrated....1263
The Empire Iron & Steel Company Sold....1263
The Improved Heald Cylinder Grinder. Illustrated....1264
The Lake Iron Ore Situation....1266
The Keystone Fence Company's Wire Mill....1267
German Iron and Steel Output Still Growing....1267
Editorial:
Tin Becoming a Precious Metal....1268
Record Breaking Pig Iron Production in March....1269
Municipal Ownership in Chicago....1269
Sustained Railroad Buying....1269
The Annoyance of Erroneous News....1270
The Philadelphia Foundrymen's Association....1270
Hearings on the Shipping Bill....1271
Bisbee Copper Mine Pumps....1271
Recent Customs Decisions....1272
Basic or Acid Steel for the Manhattan Bridge....1272
A Simple Slide Rule Formula....1272
Effects of Vanadium in Steel....1273
Oxone....1273
Air Furnace Bottoms in Malleable Practice....1273
Personal....1274
The German Wire Rod Syndicate....1274
Obituary....1274
Labor Notes....1274
A New Record in Pig Iron Production....1275
Youngstown Steel Hoop Records....1275
News of the Works:
Iron and Steel....1276
General Machinery....1276
Power Plant Equipment....1276
Foundries....1277
Bridges and Buildings....1277
Fires....1277
Hardware....1277
Miscellaneous....1277
American Engines in Great Britain....1278
Federal Regulation of Small Power Boats....1278
The Iron and Steel Trades:
A Comparison of Prices....1279
Chicago....1279
Cleveland....1281
Philadelphia....1282
Pittsburgh....1283
Cincinnati....1284
Birmingham....1285
New York....1285
Metal Market....1286
Iron and Industrial Stocks....1286
The Atha Steel Casting Company....1287
Independent Fire Brick Consolidation....1287
Peace Prospects in the Coal Trade....1288
New Publications....1288
New Competition in the Foreign Rail Trade....1288
The Machinery Trade:
New York Machinery Market....1289
New England Machinery Market....1290
Philadelphia Machinery Market....1291
Cincinnati Machinery Market....1292
Government Purchases....1293
Trade Publications....1293
Hardware:
Condition of Trade....1295
Notes on Prices....1296
The Joint Catalogue House Committee....1298
Requests for Catalogues, &c....1298
Trade Items....1298
Postal Questions Before Congress....1299
Meeting at Hot Springs....1300
Convention of Bicycle Manufacturers at Buffalo....1300
Death of Frank Chandler. Portrait....1300
The Use of the Rubber Stamp in Checking Up Invoices.1301
Correspondence....1302
The Hardware Store of Neal & Brinker Company. Illus.1303
Orton Hill....1304
Price-Lists, Circulars, &c....1304
Referred to Our Readers....1304
F. E. Muzzy on Parcels Post....1305
Gilbert & Bennett Mfg. Company....1305
Factory Cost and Business Methods. Illustrated....1306
Miscellaneous Notes:
Moore Electric Daylight....1307
Tap Wrench and Hand Vise....1308
Atlas Bolt & Screw Company....1308
Concave and Convex Gauge. Illustrated....1308
Fox Improved Square and Miter. Illustrated....1308
Double Acting Pump with Expansion Plunger in Upper Cylinder, Fig. 380. Illustrated....1309
Pullman Screen Spring. Illustrated....1309
Pneumatic Gas Lighter. Illustrated....1309
Niagara Beaters. Illustrated....1310
Diaphragm Force Pump. Illustrated....1311
Heavy Barn, Warehouse and Fire Door Hanger. Illus.1311
Current Hardware Prices....1312

HARDWARE

THERE sometimes exists an impression, often undefined and perhaps unconsciously entertained, that in a given community a certain limited and approximately fixed quantity of goods is all that can in the regular course of things be marketed. This quantity is generally estimated on the basis of past and present business, overlooking the fact that enterprising and energetic methods on the part of the merchants might result in much larger sales, even as the good cultivation of a piece of ground will secure a materially larger yield. In the past, and especially during recent years, there has been a constantly increasing sale of all kinds of articles and products, necessary and unnecessary, so that the stores in the country have become, as it were, a steadily enlarging channel through which tremendous quantities and a bewildering variety of goods pass into use among the people. Certainly at the present time there are going regularly into consumption articles, devices and commodities, staple and fancy, in constantly growing volume. There is no reason to suppose for a moment that this tendency has reached its limit and that the coming years will indicate any backward movement in this regard. There is still an enlarging supply of things which the people are waiting to buy. Fortunately for them and for the merchants and manufacturers, the growing prosperity and increasing richness of the country are rapidly putting increased resources into the hands of the people.

The credit for this development, for this increase in the goods which are finding a market, is to be divided between the makers and the distributers. On the part of the manufacturers there has been a tremendous fertility of invention and a persistent energy and resourcefulness in devising and making articles, little and great, for use in every department of life and every field of activity, responding to every real or fancied need of the people and, indeed, anticipating and stimulating their desires and requirements. The distributers, however, are entitled to their share in the finding of markets for this multitudinous and novel output. A great system of distribution has been established and channels opened through houses, large and small, into every city, town and hamlet in the country, so that the products of the mills and factories embodying the best mechanical thought and the most skilled handicraft have been brought within the reach of the people, who spontaneously, or more usually under the stimulus of efficient salesmanship, become purchasers and put the goods to actual use. The amount of thought and labor expended in thus distributing the manufacturers' products is sometimes forgotten in the admiration for the manufacturers' splendid part in this multiplication of things, most of them useful and in every way creditable, which is without a parallel in the history of trade. The share of the merchants, wholesale and retail, is, however, in many respects notable. Certainly without their ability, invention and energy there could not have been the splendid record of the past in connection with the finding of a market for the products in question.

This matter has its obviously practical application to present conditions. The sale of goods depends not only on the effort made to market them, but the quantity of goods sold depends to a certain degree on two variable conditions. One of these is the intelligence and perseverance with which they are brought to the attention of prospective buyers. A given article, such as a Penknife or a convenient household utensil, will be sold in any considerable community in proportion to the effort put forth to sell it. If it is pushed vigorously the sales will be large. If neglected and left to sell itself the sales will be small. One of the problems of the Hardware trade, with its great diversity of goods, so many of them novel and attractive, is to find means by which the largest possible number of such articles may be brought home to the attention of the public and as many customers as possible secured. The problem is how to push the sale of such varied lines. The adoption of the best methods, a general spirit of energy, alertness and skill in merchandising are assuredly requisite to secure a still wider sale of the products of the factories. Fortunately under favorable circumstances such efforts are rewarded with success and the merchant finds his business growing in volume and profit.

The matter of price is, however, an important one in this search for customers. High prices, unfortunately, by the obstinate and yet, after all, beneficent laws of trade, discourage sales, while low prices, if other things be equal, greatly increase them. An article at a high price would ordinarily have few purchasers, while the same thing, assuming that it meets a common need or inclination, if offered at a low price would find its way in the hands of many. It is often in the experience of merchants necessary to balance advantages: prices maintained at a high level with limited sales, or at a low level with a large increase of sales. It is a nice question to be determined in each case on its merits and the matter settled according to the best judgment of the merchant. There may be regret that prices tend downward with a diminishing margin of profit, but there is certainly the compensation which results from a larger volume of business. Given low but reasonable and remunerative selling prices, with a maximum of skill and energy in marketing the goods, and there will be in practically every community a steadily increasing sale of the steadily increasing variety of products which through the merchants pass to the homes and factories, the farms and the workshops of the people. The tendency is still toward larger business in every community, but the extent of the increase is to a great extent in the hands of its merchants.

Condition of Trade.

Notwithstanding occasional reports that trade has here and there shown some symptoms of a lessening pace the general movement continues in great volume. March certainly made a better record than the same month a year ago. The distributers, both wholesale and retail, are giving their attention closely and vigorously to the marketing of their products, most of them having ample stocks on hand, except in a few lines in which it is difficult to give prompt delivery. There does not appear to be any letting up in building and large orders for materials are reported by those handling such lines, while at the same time an active demand is stimulated for tools and appliances of all kinds connected with building enterprises. Structures near completion are taxing the ability of the manufacturers to furnish the requisite

Hardware, who at the same time find themselves called upon to figure on new contracts and are booking many orders for future execution. Those who are taking a broad view of the field are impressed with the rapidity with which the country is progressing in prosperity as new sections are being opened up and a better order of things replacing former conditions in some of the older parts. As an example of this the progress which is being made in the South is noteworthy and most gratifying, as a marked development is notable in its agricultural, manufacturing and mercantile interests. The amount of goods going abroad contributes not a little to the general activity and helps to keep the factories running to their fullest capacity.

Chicago.

A compilation of the sales made by several of the largest Western jobbing houses during March makes that a record month in their histories, the totals of the heavy months last fall being exceeded by comfortable margins. Of course, considerable business that was placed earlier in the year for March shipment went to increase the showing, but notwithstanding these future orders, the new business, with only a few exceptions, passed all records. The dry weather now prevailing will soon put the country roads in good condition and the farmers will again be able to visit their adjoining towns, which they have been prevented from doing during the past two or three weeks. The manufacturers of Hardware lines, while generally booked to July 1, are not closing many new orders, as jobbers are not inclined to buy heavily for future requirements at the present time with so many contracts still unfilled. High water throughout the West during February and early in March interrupted manufacturing operations to a large extent and shipments have been still further deferred. Much trouble is being experienced in securing malleable castings, which enter so largely into Hardware manufacture, and shipments are now being forwarded from the foundries by express in small lots to enable the manufacturers to fill orders. Woven Wire Fencing and Poultry Netting are moving freely and none of the producers are accumulating stocks, contrary reports notwithstanding. The sales of Wire Stretchers are likewise heavy and several new manufacturers have come into the field with new devices this spring. On other Wire products some shading has been reported, notably on future shipments of Nails. However, the concession in no case has amounted to more than a dollar a ton and more often is 50 cents. With the higher prices prevailing for raw material even these concessions are the more surprising and no doubt are influenced by the falling off in demand of the jobbing trade. Shipments of Hay and Garden Tools are now going forward in large volume, but it is too early to gauge consumption, as filling in orders cannot be expected before June. Staple goods in all lines are moving freely, indicating a heavy consumption, and the buying of Builders' Hardware increases from week to week. The manufacturers of Strap Hinges are only securing the benefits of the recent advances to a very limited extent, as most of the shipments that are now being made are on contracts closed at prices that net them only a small profit. Price changes are comparatively few and quotations, which are generally on a basis much higher than those prevailing a year ago, are fairly well maintained. Thus far the coal strike has not greatly interfered with the Hardware trade, although the closing of the mines throughout southern Illinois has resulted in merchants curtailing their requirements. It is probable that the mines in this State will continue closed until June 1, regardless of any settlement that might be made, and a falling off in the trade in sections where the mines are located is expected.

NOTES ON PRICES.

Wire Nails.—Mills are shipping specifications on contract orders which will probably keep them employed well into June. New orders are being received in comparatively small volume, but stocks are not being accumulated to any extent. Prices are firm and quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.85
Carload lots to retail merchants	1.90

New York.—The demand for small lots of Nails from store is fair. It is reported that jobbers' prices are being well maintained. Small lots from store are quoted on the basis of $2.15 per keg.

Chicago.—The new tonnage that is being placed with the mills continues comparatively light, although specifications are very heavy, indicating a wide distribution and consumption. The demand for all kinds of Wire products from the Northwest is insistent, and several of the large jobbers, unable to await the opening of the navigation season, are ordering shipments by rail. The navigation season, according to present indications, will not be opened until April 15 or 20, when heavy shipments will be sent to upper lake ports from Cleveland. Some shading nas been reported on Nails, but it is limited entirely to a few large jobbers, and in no case have these concessions amounted to more than 50 cents or $1 a ton. No change in prices is anticipated and present quotations will probably rule until July or August, when the basis will be established for tonnage that will be booked at that time for fall delivery. We quote as follows: $2 in car lots to jobbers and $2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New business in Wire Nails is light, but specifications on contracts keep the mills running to full capacity, and they are unable to accumulate large stocks. As soon as the country roads become passable again, permitting the distribution of Nails, it is believed that demand will show betterment. The American Steel & Wire Company, the Pittsburgh Steel Company and other leading Wire Nail interests are pretty well sold up to July 1. Prices are firm and we quote: Wire Nails, $1.85 in carloads to the large jobbing trade and $1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—Demand is only fair, and mills continue to keep production down to requirements. As soon as country roads become passable an improvement in retail demand is anticipated. Quotations are as follows: $1.80, base, for carload lots, f.o.b. Pittsburgh; $1.85 for less than carloads, f.o.b. Pittsburgh; $1.95 for carload lots, on dock, New York; $2 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—The condition of the local Cut Nail market remains unchanged, and demand continues in about the usual proportion to Wire Nails. Jobbers' prices are being maintained and quotations are on the basis of $2.05 per keg.

Chicago.—While the first week in April ushered in a slight betterment in demand for Cut Nails, heavy rains in the West and Northwest have militated against the increase in buying which was expected. Heavy specifications are anticipated for the remaining weeks of the month. Quotations are firmly maintained as follows: Steel Cut Nails in car lots, $1.95; less than car lots, $2; Iron Cut Nails, $2.05 in car lots; less than car lots, $2.10.

Pittsburgh.—There is only a fair demand for Cut Nails, and the mills are running mostly on specifications. With the return of pleasant weather and good country roads, demand for Cut Nails is expected to get better. The mills continue to equalize demand and output as closely as possible. We quote $1.80, base, for carload lots, f.o.b. Pittsburgh; $1.85 for less than carloads, f.o.b. Pittsburgh. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

Barb Wire.—Comparatively little new business is being received by the mills, which are busy filling specifica-

tions on contract orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.00	$2.30
Retailers, carload lots	2.05	2.35
Retailers, less than carload lots	2.15	2.45

Chicago.—Notwithstanding the tremendous increase in consumption of Woven Wire Fence and the general replacement of Barb Wire the production of the latter shows a healthy increase over that of the first three months last year. Consumption of this product shows a slight increase, although it is generally believed that it is on a decline on account of the heavy demand for Woven Fence. Quotations are unchanged, as follows: To jobbers, Chicago, car lots, Painted, $2.15; Galvanized, $2.45. To retailers, car lots, Painted, $2.20; Galvanized, $2.50. Retailers, less than car lots, Painted, $2.30; Galvanized, $2.60. Staples, Bright, in car lots to jobbers, $2.10; Galvanized, $2.40; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Very little new business is being placed, but specifications on contracts are coming in freely. The mills look for a very heavy spring trade. Prices are firm, as follows: Painted Barb Wire, $2, and Galvanized, $2.30, in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in ten days.

Smooth Fence Wire.—Demand in the way of new orders is light, but mills are busy filling orders already booked. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in ten days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—As the Woven Wire Fence season is fast coming to a close from a manufacturing standpoint the consumption of Smooth Wire is being greatly curtailed and practically no new tonnage is being booked from the Fence manufacturers. The season for Telephone Wire is now well under way and telephone companies are buying heavily. Bale Ties are also going forward in large volume and jobbers are preparing for a heavy consumption. Quotations are unchanged, as follows: To jobbers, $1.85, f.o.b. Chicago, in car lots, and car lots to retailers, $1.90.

Pittsburgh.—The mills that make Fence Wire are turning out an enormous tonnage, and are much behind in deliveries. Bale Ties are also moving freely and a fair amount of new tonnage is being placed, although the mills are running mostly on specifications on contracts. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in ten days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The above prices are for base numbers, 6 to 9.

Binder Twine.—Twine buying is more or less active, according to location and requirements. A large quantity of Twine had been purchased on memorandum orders before prices were announced. The variation in prices, which is unusual at the commencement of the season, is calculated to introduce a feeling of uncertainty as to the future trend of the market, in the minds of would-be purchasers. Quotations are unchanged and the following fairly represent the market:

	Cents per pound.
Sisal	9¾ to 10
Standard	9¾ to 10
Standard Manila	10¾ to 11
Manila (600 foot)	12 to 12¼
Pure Manila (650 foot)	13 to 13¼

Five-ton lots, ⅛-cent less. Carloads, ¼-cent less. F.o.b. Central points, with the usual ¼-cent added for Northwestern and Missouri River delivery. A ¼-cent reduction on the above schedule of prices would fairly represent the Eastern market, this being the difference in freight between Central points and New York.

Sandpaper, Emery Cloth, Etc.—New list prices on Sand, Garnet and Emery Paper and Cloth have been adopted by manufacturers, going into effect April 10. In a general way it may be said that the lists represent advances covering the increased costs of paper and other raw material which the manufacturers have had to pay for some time. It is understood that no changes in terms and discounts have been made. Following is the new list on Flint Paper in reams, which is subject to a discount of from 60 to 60 and 10 per cent. to average retail trade:

Flint Paper, in Reams.

Nos.	9 x 11	9 x 12
4/0	$6.25	$8.25
3/0	6.25	8.25
00	6.25	8.25
0	6.25	8.25
½	6.25	8.25
1	6.75	8.75
1½	7.25	9.25
2	7.75	9.75
2½	8.25	10.25
3	9.50	12.25
3½	10.75	13.75
4	11.75	15.25
Assorted 9 x 11	$7.25	

Nos.	8¾ x 10½
00	$4.25
0	4.25
½	4.25
1	4.75
1½	4.75
2	4.75
2½	5.25
3	5.25
Assorted	$4.75

Rope.—The market is represented as being firm, with a fair to good demand. Opening of navigation is scheduled for the Great Lakes in the near future, when orders that have been given manufacturers will be shipped to that territory. Some large merchants have anticipated shipments of portions of contract orders and ordered them forward by rail. Quotations are as follows: Pure Manila, 12½ cents; B quality, 11½ cents; Pure Sisal, 9½ cents; No. 2 quality, 8 cents per pound.

Paris Green.—It is learned that some manufacturers will announce prices of Paris Green on April 14. This policy may be followed by all makers of Green.

Window Glass.—At the meeting of the Eastern Jobbers' Association, held last week, 90 and 10 per cent. discount for all single and double strength Glass was decided upon as the minimum price. This was agreed to by all jobbers except those of the New England States. With the above exception, the price is effective in about all the territory east of Pittsburgh. Demand upon manufacturers continues large, and the belief is expressed that after the meeting of manufacturers scheduled for the 19th inst. prices from factory will be higher. New York quotations are now 90 and 10 per cent. discount for all sizes of single and double strength. Demand at this point shows some improvement.

Linseed Oil.—Demand for both large and small lots of Oil is light. Weather conditions are not favorable for outside work, so that requirements do not compel retail merchants to purchase. For contract orders prices vary according to seller, but as most large dealers have Oil to come on contract orders demand is light and the market weak. City Raw is quoted at 42 to 43 cents per gallon. Out of town Raw is held at 39 to 40 cents for any quantity, with deliveries on contract orders extending to August 1. Boiled Oil is 1 to 2 cents advance over Raw.

Spirits Turpentine.—During the week under review prices have fallen off 1½ cents per gallon. Business is comparatively quiet. New York quotations are as follows, according to quantity: Oil Barrels, 69½ to 70 cents; Machine Made Barrels, 70 to 70½ cents per gallon. The lower prices have been occasioned by the absence of buyers and a lower Savannah market. At Savannah heavy receipts from the smaller ports have come in at lower than the regular prices. While prices may not go much lower, the receipts of the new crop of Turpentine may prevent them going higher.

THE HAWKEYE PUMP COMPANY, Washington, Iowa, in addition to Galvanized Pumps is now manufacturing Rural Free Delivery Mail Boxes, Hog or Sheep Dipping Tanks, Stock Tanks and Stove Pipe Thimbles. The Hawkeye Dipping Tanks are made of No. 20 galvanized iron, with angle iron around top, sides and bottom. The angle on top is on the inside, so that it prevents to a certain degree the waste of fluid.

THE JOINT CATALOGUE HOUSE COMMITTEE.

A. H. ABBE of New Britain, Conn., has been offered and has accepted the vacancy upon the Joint Committee made vacant by the resignation of T. Frank Ireland, on account of failing health. Mr. Abbe has been an executive officer of the National Retail Hardware Association for two years and has kept himself in close touch and sympathy with Joint Committee work. He is president of the New Britain Business Men's Association and an ex-president of the Connecticut Retail Hardware Association. His acceptance of this position will certainly add to the strength of the committee and gives the retail interests an Eastern representative.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM A. D. HOUSTON, who has opened a new Hardware, Stove and Tinware store in Jacksonville, Ore.

FROM M. W. MILLER, who has bought out the Hardware, Stove, Paint and Tinware business of the Miller Company, Canton, Ohio.

FROM O'HARE HARDWARE COMPANY, Maysville, Ky., which is adding to its stock Stoves and Tinware, Enameled Ware, Refrigerators, Ice Cream Freezers and general household supplies.

FROM CONSUMERS SUPPLY COMPANY, Los Angeles, Cal., which is in the market for a stock of General Hardware and Tools.

FROM BELTZ & DELAVIE, 524 Penn avenue, Pittsburgh, Pa., who are now located in their new store and are in the market for Automobile and Bicycle Supplies.

TRADE ITEMS.

THE MANHATTAN ELECTRICAL SUPPLY COMPANY, now at 32 Cortlandt street, New York, will, on or about May 1 next, occupy the entire building at 17 Park place. There are five floors above the street and accompanying cellar room. The building is being renovated and remodeled both inside and out to adapt it to the company's requirements.

E. B. ESTES & SONS, 45, 47 and 93 John street, New York, are distributing an illustrated circular and alphabetical index of the wooden goods manufactured at their New York, Pennsylvania and New England factories. The index arouses no little surprise in one not acquainted with the scope of the wooden goods industry, comprising close to 750 different articles, many of which are made in a number of sizes. Among the principal lines listed are Lock Corner Boxes, Turned Boxes and Mailing Cases, Handles, Dowels, Spindles, Athletic Goods, Toys, &c.

THE MASBACH HARDWARE COMPANY, which will open the doors of its new building at 84 Warren street, New York, on Monday next, as recently referred to in these columns, has just issued a new supplement and discount sheet of 27 pages. This pamphlet has been condensed from the company's full catalogue and contains also many added items of interest concerning the goods dealt in and stocked.

THE honor in which George M. Landers of Landers, Frary & Clark is held by his fellow townsfolk is indicated in his enthusiastic nomination by the Republicans of New Britain for Mayor of the city, and his subsequent endorsement with equal unanimity by the Democrats. New Britain is to be congratulated on the prospect of a nonpartisan administration, directed by a Mayor of such ability and character.

JAMES O. SPEAR, Hardware manufacturers' agent, representing Colebrookdale Iron Company, Hendricks & Class, J. Walter Miller, Franklin Specialty Company, Crandall Cutlery Company and other manufacturers, has removed his office and sample room to the Ingram Building, Baltimore, Md. Mr. Spear has been identified with the Hardware commission business of Baltimore since July 1, 1852, and is now probably the oldest Hardwareman in Baltimore.

BUTLER BROTHERS, Chicago, have leased from Sears, Roebuck & Co. about 250,000 square feet of floor space in the building formerly occupied by the latter firm at Fulton and DesPlaines streets. The space leased comprises the entire ten-story building at this location, which is 150 x 170 feet. The lease runs for one year, the lessee having an option on a five-year extension.

SHIDLER BROS., South Bend, Ind., have decided to close out their large stock of General Hardware, Stoves, Furnaces, Sporting Goods, Fishing Tackle, &c., owing to the failing health of A. N. Shidler. Mr. Shidler and his brother, J. W. Shidler, are well and favorably known to the Hardwaremen of the State through their prominence and activity in Hardware association work, and A. N. Shidler was re-elected last February to the presidency of the Indiana Retail Hardware Association. Their brother merchants will regret to learn of their withdrawal from the Hardware field, especially in view of the reason prompting it.

A FIRE occurred a few days ago in the plant of the H. C. Tack Company, Cleveland, Ohio. A serious loss was incurred which will probably necessitate the refusal of considerable new business. It is stated, however by J. C. McCarty & Co., 10 Warren street, New York, who are agents for the company, that there will be no great delay in filling orders already booked.

No less than 40 sizes of the Farny Safety Guard, used in connection with the Farny Razor, are manufactured by F. A. Reichardt & Co., 391 Broadway, New York. The guards are made of nickeled German silver, and no adjusting skill is required other than to mechanically slip the guard on the blade in either of two ways, for right or left shaving. The Farny Razor is made from the finest Swedish steel, double concaved and extra hollow ground, with serrated shank surfaces, top and bottom, to afford a good grip.

F. H. KYTE, Pittston, Pa., for 23 years manager of the Hardware store of S. P. Fenn, who recently retired, has embarked in business on his own account under the style of the Pittston Mercantile Company. Mr. Kyte will carry on principally a commission business, acting as selling agent for manufacturers.

THE METAL STAMPING COMPANY, Jackson, Mich., has purchased a large tract of land at Michigan Center, upon which an extensive plant will be erected during the coming summer. The new factory will be devoted to the production of the company's metallic refrigerator. It is expected to begin the construction of the plant in May and to have it completed in September.

THE J. F. HOWE HARDWARE & SUPPLY COMPANY, incorporated under the laws of Pennsylvania and capitalized at $60,000, has purchased the Hardware, plumbing and heating business at Freedom, Pa., which J. F. Howe has conducted at that place for the past six years. The new firm has purchased a corner lot, 60 x 90 feet, and has already let the contract for a store building to cover the entire lot. The building will be two stories above the sidewalk and will have a ten-foot basement, which will be used for tin and plumbing shops. The larger part of the basement will be above ground and consequently well lighted. The shops will be fitted up with pipe cutter, drill presses and other shop machinery, driven with a gas engine. The engine will also pump water from a drilled well into a Kewanee pneumatic tank, which will supply water for the building under any pressure desired up to 100 pounds. The building will have no partitions on either floor, the floors being supported by iron columns. The store will be equipped with elevator for freight, will have fireproof vault, be heated by hot water, fitted with up to date ladders, shelving, floor and wall cases, and when completed will be one of the finest Hardware stores in western Pennsylvania. Mr. Howe is president and manager of the new concern.

POSTAL QUESTIONS BEFORE CONGRESS.

FROM OUR SPECIAL WASHINGTON CORRESPONDENT.

WASHINGTON, D. C., April 10, 1906.

THE debate upon the annual Post Office Appropriation bill, which has now been in progress in the House for more than a week, has developed a number of facts of vital importance to the retail Hardware merchants of the country. The provisions of the bill with regard to the expansion of the rural free delivery and the refusal of the committee to consider parcels post amendments have been described in this correspondence, but in the debate on the measure members of the committee and others have reflected a feeling in the House that promises a revolution in postal methods in the near future.

THE POSTAL DEFICIT.

Figures have been produced in the discussion of the bill designed to show that the *bona fide* postal service is now on a self supporting basis and that the current deficit of approximately $15,000,000 per annum is only apparent and is the result of three causes: First, the free transportation of the mail of the executive departments of Congress; second, the transportation as mail matter of large quantities of post office supplies, furniture, &c., at a cost far in excess of the freight charges thereon; third, the transportation at second-class rates of vast quantities of house organs and other literature, which under a fair interpretation of the present law would be required to pay at least third-class rates, or 8 cents per pound instead of 1 cent per pound. Of the causes referred to it is probable that the transportation of the official mails, including articles that properly should go by freight, is most important, and it is undoubtedly a fair estimate that if each department should pay for the transportation of its own publications and if all articles of merchandise now forwarded by the Government through the mails should be sent by freight the reform would make a difference of at least $30,000,000 in the revenues of the department, and there would be a surplus of $15,000,000 instead of a deficit of that amount.

These facts and their proposed remedies are of much significance in their bearing upon the parcels post and consolidation schemes, which are now being urged upon the attention of both post office committees as independent measures, which it is desired shall be taken up as soon as the Post Office Appropriation bill is disposed of.

PARCELS POST ON RURAL ROUTES.

In the debate on the pending bill, a statement by Representative Foster of Vermont, who strongly favors the adoption of a parcels post on rural routes, has attracted much attention. Mr. Foster stated at the outset that the cost of carrying newspapers and periodicals, including house organs, &c., of every description, was at least $30,000,000 in excess of the postage rate thereon. Of this amount he thought that fully one-half would be recovered by the Government if publications of all kinds should be reclassified so as to compel the publishers of purely advertising matter to pay at least the cost of handling. There are many other members of the House who share Mr. Foster's view on this point, and who believe that the safest method of maintaining the present low rate of postage on daily newspapers and legitimate trade publications and magazines is by a system of reclassification, which shall require the house organ and the publication maintained solely for advertising purposes to pay its way in the mails.

Adding to the $15,000,000 which Mr. Foster claims properly to be chargeable against the other departments one-half the $30,000,000 now expended by the Government for handling second-class matter, which, in his opinion, the publishers should pay, Mr. Foster secures a total of $30,000,000, which would thus be saved to the service and which would transform the present deficit into a surplus of almost the same amount. But Mr. Foster does not stop with this demonstration. Like all the advocates of so-called postal reforms, his principal object in wiping out the deficit is to justify increased expenditures. His particular fad is the establishment of a parcels post on rural routes, which he outlines as follows:

We all know that every business man who has a large and diversified business takes great pains to see that each department is self-supporting. We ought to see if some means cannot be devised by which those rural carriers could increase their earning power to the Government. I believe that a very simple way could be devised. Suppose we should pass a law providing for a special postal rate on packages between the post office and the patrons on the several routes emanating therefrom. Today, if the farmer on one of these routes desires 4 pounds of Nails brought him by the carrier, he can telephone the Hardwareman in the village, and the latter can take the package to the post office and send it out by the rural carrier. But the postage is 64 cents, and therefore prohibitive. By making the postage on such a package 5 cents, and increasing it to 10 cents for a 10-pound package, it would be possible to greatly increase the postal business on these routes without in any way detracting from the efficiency of the service. The average weight of mail carried by these carriers probably does not exceed 50 pounds. The carrier could easily carry another hundred pounds. And I am firmly of the opinion that if the necessary legislation in this behalf was had it would be but a short time before many of these carriers would be earning their $2 per day in carrying this extra postal matter and the service would be self supporting. Then again, we would hear less talk about a deficiency in the Post Office Department because of the rural service.

Mr. Foster's project for the handling of merchandise on rural routes is not a new one. It was first suggested by Assistant Postmaster General Bristow and was investigated by the House Post Office Committee far enough to demonstrate the fact that it would be of enormous advantage to the mail order houses in distributing their catalogues, whereupon it was immediately abandoned. The catalogue houses have urged it by every means they could discreetly employ, but it has made no progress in popularity except with the Postal Progress League and other "reform" organizations.

METHODS OF BOOKKEEPING.

There is a fallacy underlying Mr. Foster's calculations that should not be lost sight of by the retail merchants of the country. It will be observed that he wipes out the current deficit by what he styles "the proper method of bookkeeping," which involves charging to the several executive departments the cost of handling their respective mails. The result, however, is merely to take money from one of Uncle Sam's pockets and put it into another, for inasmuch as the money of the taxpayers at large is used quite as freely to pay the expenses of the several executive departments as to reimburse the postal deficit, it is a matter of absolute indifference to the average citizen how the account is settled. In any event he must pay his share either of the cost of the departmental mails or of the postal deficit.

AN EXPERIMENTAL PARCELS POST?

But here is where the parcels post boomer takes advantage of these specious arguments. Relying upon the figures presented by Mr. Foster, the postal reformers are besieging the House and Senate committees to adopt an "experimental" parcels post between half a dozen of the leading cities of the East and West. It is urged in this connection that it has been shown that in spite of the official figures there is really no postal deficit at the present time, and the Postmaster General's annual report is quoted as justifying an experiment, with a view to demonstrating the cost of handling merchandise by mail in relatively large quantities. The ingenious argument is put forward that whether Congress is now prepared to adopt a parcels post or not it ought to have before it some reliable information as to the cost of such an institution. The data necessary to an estimate of the expense of maintaining such an adjunct of the postal service can only be obtained through an actual experiment. If it proves to be too great the subject can be abandoned, but it is predicted that the increased patronage of the mails would largely augment the revenues. In any event, the "great convenience to the public" would justify the creation of a moderate deficit.

These arguments will be recognized as old friends. They were put forward in support of the experimental appropriation of $10,000 which was originally made for the rural free delivery service, which for the coming fiscal year will cost the stupendous sum of $28,000,000, all but $4,000,000 of which will be paid by the taxpayers at large for the benefit of less than one-tenth of the population of the country who receive their mail on rural routes.

REFORMS TO BE RECOMMENDED.

While the House Post Office Committee and other conservative members of the House will oppose a parcels post they will nevertheless urge important action designed to wipe out the current deficit. The pending appropriation bill contains a provision limiting to four pounds all packages which the Government Departments may send through the mails. It also prohibits the use of Congressional franks by associations for the gratuitous distribution of Government documents, a provision that may be construed to prohibit the franking of speeches for campaign purposes, a practice that now costs the taxpayers many million dollars annually. Another reform is foreshadowed in the provision of the bill requiring that a classified record be kept of all second-class matter to be used as a basis for the readjustment of rates.

The post "reformers" are following these projects with close attention and the deepest satisfaction. To their minds those changes in the law will wipe out the current deficit only to pave the way for a domestic parcels post. Retail merchants everywhere should follow developments with equal vigilance and should be prepared to insist that if the projected modifications result in putting the postal service on a self supporting basis that basis should be maintained and not employed as a stepping stone to unbridled extravagance. W. L. C.

MEETING AT HOT SPRINGS.

CAREFUL attention is being given by the officials of both the American Hardware Manufacturers' Association and the Southern Hardware Jobbers' Association, to arrangements for the meeting at Hot Springs, Va., in June. The gathering promises to be not only a large one, but interesting and important, in view of the practical questions which will be considered. Among these are "The Effects of Quantity Differentials" and the "Integrity of Contracts." Both of these subjects will be discussed at joint sessions and by prominent members of both associations. It is probable, too, that in one form or another, questions concerning advertising in the programmes of the retail associations will be considered.

F. S. Kretsinger, the president of the American Hardware Manufacturers' Association, will not be present at the convention, as he has just sailed for Europe, expecting to be abroad until October. While his absence will be regretted he will have the congratulations and best wishes of a host of friends in connection with this well merited respite from the cares of business and official duties.

CONVENTION OF BICYCLE MANUFACTURERS AT BUFFALO.

THE Cycle Manufacturers' Association and the Association of Bicycle Parts and Accessories met in convention at the Lafayette Hotel, Buffalo, on the 4th inst.

An important feature of the meeting was the consideration of plans for reviving interest in and increasing the use of the bicycle and booming the bicycle trade.

A committee was appointed to perfect plans and report their recommendations at a meeting of the associations to be held in Buffalo, May 4. It is the purpose of the associations to make a united and energetic effort to reawaken interest in the bicycle trade and inaugurate a movement to renew the popularity of bicycling.

WILHELMI, HALL & CO., 93 Reade street, New York, foreign and domestic merchants, have just issued the first "Wilhelmi-Hall Price-Current" of Hardware and metal goods. This 28-page pamphlet is being distributed in the interest of manufacturers whose products they are representing in and about New York City. The price-current, to be issued monthly, contains such list prices as will enable them to quote a single uniform discount on all lines of the various manufacturers whose names, addresses, catalogue pages and descriptions are reproduced. This method is used to avoid complicated and confusing discounts.

DEATH OF FRANK CHANDLER.

FRANK CHANDLER, president of the Chandler & Farquhar Company, Hardware and Machine Tools, Boston, Mass., died at his home, Waverly, Mass., April 4, of pneumonia, aged 54 years. Mr. Chandler was one of the most prominent men in the trade in Boston. He was born in Augusta, Maine, in 1852, the son of Commodore Benjamin F. Chandler, U. S. N., and passed most of his boyhood at Portsmouth, N. H., where his father was attached to the navy yard. As a young man he entered the employ of A. J. Wilkinson of Boston and thoroughly mastered the Hardware business in the 15 years of this connection, after which, in 1882, he formed a partnership with Charles S. Farquhar as Chandler & Farquhar, which relation existed until 1904, when the business was incorporated, with Mr. Chandler as president and Mr. Farquhar as treasurer.

Mr. Chandler was a prominent Mason and Odd Fellow. He was conspicuous in town affairs during a long residence at Belmont. He was a former selectman and in 1895-1896 represented the town in the Massachusetts House of Representatives. He was a member of the New England Hardware Dealers' Association, of the National Supply and Machinery Dealers' Association and of the Boston Merchants' Association. He was a vice-president of the Waverly Co-operative Bank. His numerous affiliations gave to him a very wide acquaintance and a great number of warm personal friends, who were greatly shocked and grieved to hear of his death. He leaves a widow, an aged mother and one son, F. Alexander Chandler, secretary of the Chandler & Farquhar Company and also secretary of the New England Hardware Dealers' Association.

FRANK CHANDLER.

The funeral, held Sunday at the Waverly Unitarian Church, was under the direction of Masonic orders, and the attendance was so large that the auditorium was inadequate, many persons coming from a distance, with large delegations from various Odd Fellow and Masonic orders. The pallbearers were six of the employees of the Chandler & Farquhar Company, other employees acting as ushers, the honorary pallbearers including both immediate friends and representatives of various secret orders. The funeral of Mrs. Sarah A. Rice, Mrs. Chandler's mother, occurred the same day, and Mrs. Chandler is seriously ill with pneumonia, the disease which caused the death of both her husband and mother.

The Colfax Implement Company is building a fine two-story brick building, 75 x 90, at Colfax, Wash., to be used for the growing business of the firm.

THE USE OF RUBBER STAMP IN CHECKING UP INVOICES.

BY JOHN M. TOWNLEY.

IN the routine work of receiving, checking up and paying his invoices every Hardware dealer has some method that experience has developed. While each merchant travels his own road, yet all are trying to reach the same end, that is, the knowledge that all the goods have been received, that any shortage of merchandise or error in freight weights and rates is detected.

Checking Interrupted.

This checking up process, however, cannot be done all at one time. Aside from the fact that the invoice comes in by mail one day, the goods by freight a day or more later and the freight bill later yet, the actual work of checking out the goods themselves against the invoice is subject to constant interruption. Whoever is doing this work may be interrupted at any moment to wait on customers or to do other duties more pressing at the time. Some simple device therefore should be used which will make it possible to show a record of every distinct operation through which the invoice must pass, between the time it is received and the time it has been paid and is ready to be permanently filed away. The rubber stamp reproduced below is one that actually fits the needs of one retail Hardware dealer, but of course may readily be modified to meet the requirements of others:

Invoice No.....
Can be discounted.....
Date ordered.....
Invoice received.....
Invoice posted.....
B/L checked.....
E/B checked.....
Invoice checked.....
Freight proportioned.....
Goods marked.....
Claims made.....
Freight allowance.....
Invoice paid.....
Discount taken.....

Three Things Are Necessary

for this receiving system: First, the rubber stamp already referred to and shown above. This is 1½ x 3 inches in size and consists of phrases indicating all the operations and checks that should be made against every invoice, short or long. We will take up each in order, but in actual use this order could not be carried out in every case. For example, if the shipment came from a distance and you have discounted the bill the date showing when invoice was paid may be entered several days ahead of the record of day goods reached your house, as indicated by date on which the bill of lading was checked.

Second, a blank book having the pages ruled and lines numbered, as shown, and columns for date, name

No.	Date.	From Whom Bought.	Amount.
1			
2			
3			
4			
5			

of consignee and amount. A common lined book, numbered and ruled up and down by hand, will serve this purpose. Third, a tickler to keep before you the days on which discounts may be taken. For this a yearly diary will answer, having space enough for listing the invoices subject to discount on each day. Now you are

Ready for Business.

On receiving the invoices from the mail, stamp them either on the front, if there is room, or on the back; then, turning to your book for listing invoices, enter there the date of invoice, firm's name and amount. As a check to show that this has been done, enter the invoice number on the first line of the stamp. On the next line enter the date on which the invoice can be discounted. If a regular term bill and invoice is dated February 2, this would be February 12, so you would turn to your diary on February 12 and enter here the record to pay invoice No. 1 to..... for $..... If the bill was bought on fall dating the notation of day of discount would be on September 10 or October 10, as the case might be. The line

DATE ORDERED

is of value to show, first, that you know the goods were ordered, and second, how promptly the order has been filled. This date would be taken from your copy of the order, and no matter whether this order was given to a salesman or sent by mail, your files are not complete unless you have a copy of it. Insist upon salesmen leaving copies of their orders with you. This is particularly important where goods are bought for future shipment.

INVOICE RECEIVED.

Here enter date on which invoice reaches you.

INVOICE POSTED.

This is a reminder for the bookkeeper, to whom all invoices should next be passed. When he has credited the account of firm from whom bill was bought he shows this by checking with his initial or date on invoice posted.

B/L CHECKED.

It may be a day or two before the drayman unloads at your door the boxes, &c., making up the shipment. Make it a rule that he cannot unload until some one is at hand with the bill of lading, or copy of original bill of lading, which accompanies all invoices, to check off the packages received. This prevents any goods being delivered that you have no record of and any shortage in original packages or boxes is detected at once, so that prompt action may be taken on notifying both the railroad company and the shipper. The next line,

E/B CHECKED,

is a reminder that weights and rates are to be looked up and checked, and if error is found a report made so that the proper claim will be made against the railroad company. Date of making such claim and its nature should be entered on the line

CLAIMS MADE.

The goods are now opened and invoice checked off, item for item. Remember that while we have taken up these points in order, one after the other, in actual experience there will be many interruptions, and hours, days and weeks may even pass between some of these operations. The idea is that the face of the invoice shows at a glance just what has or has not been done. The line,

FREIGHT PROPORTIONED,

is a reminder for the man that prices the goods to divide correctly the total freight and add it to the cost of the goods.

GOODS MARKED

is a reminder that all the items received are to be marked with cost and selling price. This line must not be checked up until all the goods are so marked and put in stock. Record of any claim made for shortage is noted on the next line,

FREIGHT ALLOWANCE.

Some goods are sold delivered, or with freight allowance. This line acts as a reminder to make the proper deduction in a remittance, provided the invoice comes under that class. If it does not, simply write in the word "NONE."

INVOICE PAID

is indicated by proper date, and the last line is just a reminder against overlooking the discount if payment is made within the discount limit.

This plan, although simple and inexpensive, is effective. It insures all invoices being recorded, checked up and paid in a systematic, businesslike way, and cuts out nearly all loss through forgetfulness or interruptions.

Correspondence.

ONE PRICE TO EACH CLASS OF BUYERS.

A REPLY TO ED. FORD.

To the Editor: Mr. Ford in his letter to *The Iron Age* of March 22 questions the judgment of the former president of the National Retail Hardware Association in relation to the question of one price to each class of buyers and doubts the "feasibility of the same." That the largest buyer gets the lowest price has been the rule always. But methods are changing, and the ways that once were not objectionable have under new conditions become immoral.

FOR A MANUFACTURER TO HAVE FAVORED CUSTOMERS

is to be unfair to the balance of his trade. Let me illustrate. The manufacturer has one customer who buys, we will say, 20 per cent. of his output. Because of this large buying he gets low prices; so low, in fact, that he can sell at the price others pay and have a fair margin. The other 80 per cent. of the manufacturer's output is divided among, say, 150 customers. Now, should the one be put in position to drive the others to the wall? If they are driven to the wall can the one remaining handle all the output of the manufacturer? And, if he can, will the manufacturer be as likely to receive as fair treatment when his customer realizes that he is the only one left to buy of him?

MORALLY SPEAKING,

has the manufacturer any right to so conduct his business that it can be made possible that part of his trade can be driven to the wall because of favoritism?

Suppose we go a little further and say that the person who buys 20 per cent. of the manufacturer's output is a retailer—one who sells his goods by the single item, who quotes prices by the single item, and solicits the consumers' trade only—while the 150 other customers of the manufacturer are those who depend on selling what they have bought to the retailer, who expects to sell them to the consumer. Now, how stands the conditions? The one who buys the large quantity is put in position where he can not only sell cheaper than any other retailer, but can sell as cheap as a large percentage of the others who buy to sell to the retail trade.

I am very glad that Mr. Ford and I can stand on the same platform, for I fully indorse his position when he says, "We fully believe one price to all, regardless of quantity, to be the just and equitable way of doing business—that is, one price for all consumers, one price for all retailers and one price for all jobbers"—and I am especially glad of his testimony when he says, "Many manufacturers live up to this one price to retailers, another to jobbers, regardless of quantities." Now, if the above position is just and equitable, why is it not practicable as well? Can we afford to say that it is impossible to be just and honest if we engage in business? I hardly think Mr. Ford would subscribe to any such position as that.

IT IS NOT WHAT THE CATALOGUE HOUSES SELL,

for that is but a drop in the bucket of trade, but it is the facilities given them by special prices so that they can advertise all over the country prices on leading goods so low that the impression is created that the regular retailers are seeking to get too large profits. If they were local their price cutting would not be so bad, but it is a price cutting that is broadcast and so makes prices and dissatisfaction in places where, perhaps, they do not make any sales. So I say to give any class of merchants prices that enable them to do so is immoral.

IS IT ALTOGETHER FAIR

in a discussion to cite a comparison between two buyers, one of whom buys 100 pounds of Bolts and the other five carloads, and call them both retailers? There are not many retailers who buy five carloads of Bolts with the expectation of retailing them over the counter. Neither is the one who buys $25 worth of Tinware to be put in the same category with the one who buys in ten-car lots. But if they are both retailers, then the little fellow should have a chance to live and favors should not be given to others that will enable them to drive the little ones to the wall. But, you say, that is business. We have had some business of that kind, and the men who have been practicing it are fearful of the law, and public opinion is holding them up to the scorn they deserve.

IT DOES NOT FOLLOW

that because certain things have been done in the past that they will always be done, especially if there is any question of their justice or equity. There is an innate sense of justice in the human heart that will insist on fair play. All we hope for may not come at once, but the questions are being agitated as never before, and our hope for justice and equity is in an aroused conscience. Evils that have been intrenched so strongly that men's hearts failed them when they attempted to abate them are giving away and there is hope for all of us as we see them break down. That the retailer is always square, that the jobber is always fair, in their dealings I would not for a moment claim, but I think I see an improvement.

RETAILERS ARE LEARNING THAT PRICE CUTTING

is not the way to sell goods to get a profit, and they are learning also that competition is to be expected and that the man who sells the goods is the best salesman. There is a growing friendliness among retailers that is taking the place of the suspicious and envious feeling that retailers used to have toward each other. But we are not angels yet, and neither do I suppose are the jobbers, but we are learning, and that is the hope of the trade of the future.

I do not want to believe that I am justified in doing wrong because some one else is doing so. I do not want to say that you had better get the beam out of your eye before you try to get the mote out of mine. Neither do I care to discuss the question of who is to blame. But I would like to put the past behind us and face the conditions of present business, and in a friendly conference see if there is not a solution that will be just and equitable for all of us.

W. P. B.

SYNDICATE BUYING FOR RETAIL MERCHANTS.

FROM AN OHIO MERCHANT.—In regard to syndicate buying, while the proposition, as stated in the March 29 issue of *The Iron Age*, looks plausible and enticing, I think there are many other conditions which would have a tendency to put the syndicate buying in a different light. At the present time the retailer's greatest enemy is the catalogue house. At the same time, the general sentiment in a great many sections with the consumer is turning toward patronizing their home merchants, and this sentiment is growing largely among this class of people. The manufacturer, jobber and retailer have to a large extent co-operated in a systematic and aggressive campaign against this class of competition to such an extent that at the present time 97 per cent. of the Hardware manufactured is marketed through the legitimate Hardware merchants.

WHAT MIGHT HAPPEN.

If the majority of retail Hardware dealers should adopt this plan of syndicate buying it would mean that the jobber would be obliged to dispose of his goods through a different channel from that used at the present time, and this necessarily would make him a strong competitor of every retail dealer in the country, as his goods would go direct to the consumer through the same channel through which catalogue houses market their goods. This condition of things would be demoralizing to all kinds of lines of the retail business. If the average retail merchant would, at the present time, give more of his attention to the selection of his goods and the selling of them, and to the keeping of his store in a neat, attractive and up to date condition, paying less attention as to where he thought he could buy his goods the cheapest, he would be far better off and his nightmare of the catalogue house would be a thing of the past.

In summing up the whole matter, I think the best plan to follow is for the manufacturer, jobber and dealer to work together in a harmonious manner for the best interest of all concerned.

The Hardware Store of Neal & Brinker Company.

SECOND ARTICLE.

CONTINUING the description begun in our last issue of the Hardware store of Neal & Brinker Company, attention may again be called to the arrangement of the shelving, so as to give a uniform appearance, pleasing to the eye. As before stated, the outside ends of the

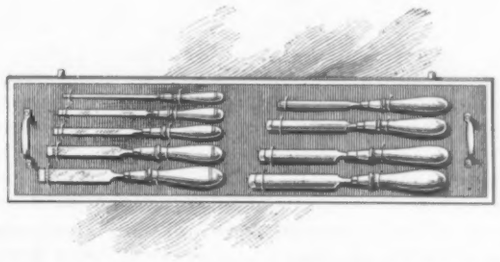


Fig. 5.—Sample Board Fronting Compartment for Chisels, Green Background Shaded, Border Yellow.

bins and compartments into which the lower ledges, shown in Fig. 8, are divided are fitted with flush sample boards, to which are attached samples of all the goods which the compartments contain. If, as is often the case, a compartment is occupied by a single drawer, plain, or divided into sections, as, for example, the bottom drawer in Fig. 8, no sample board is necessary, the drawer front serving the purpose equally well. In the same way samples are displayed on the front of the drawers and shelf boxes occupying the upper shelving, in which smaller and lighter goods are kept. All these sample boards, drawer fronts, &c., are covered with dark green paper having a narrow border of light yellow. The bright metal of the samples is

WELL SET OFF

by the green background, while the margin affords relief to the eye and assists in distinguishing the different sections and groups of samples from the floor. This decorative scheme is illustrated by Fig. 5, showing a sample

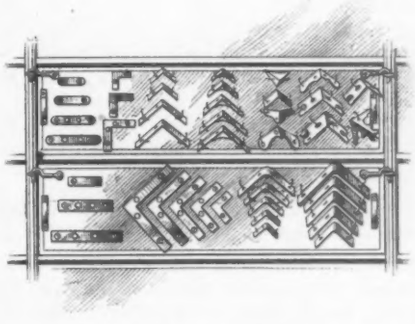


Fig. 6.—Sample Boards of Angle Irons Held in Front of Bins by Hooks and Eyes.

board of Chisels and Gouges, 8½ x 30 inches, actual size, fronting a compartment filled with two sectional drawers, which will be illustrated and described in a later article. The green background is indicated by the shaded lines, the plain margin, of course, being the yellow border. The cut also shows the brass drawer pulls by which the board is put up or taken down and the two ½-inch wooden dowels on the upper edge, which fit into sockets in the casing and hold the board in place. Where the samples are unusually numerous and heavy, like the Angle Irons illustrated in Fig. 6, so that they pull the board out of place, Brass Hooks and Eyes are used at the upper corners, as shown in the cut. The stock of Angle Irons is kept in bins behind the sample boards. In Fig. 7 we have a

SECTION OF SIDE WALL

running from floor to ceiling, showing the arrangement of drawers and shelf boxes of different sizes and proportions, ranging from 15 x 36 inches at the bottom to 3 x 4½ inches at the top. The large ledge drawers at the bottom are used for the accommodation of Wrenches, while goods above the ledge consist of Champion, Perfect

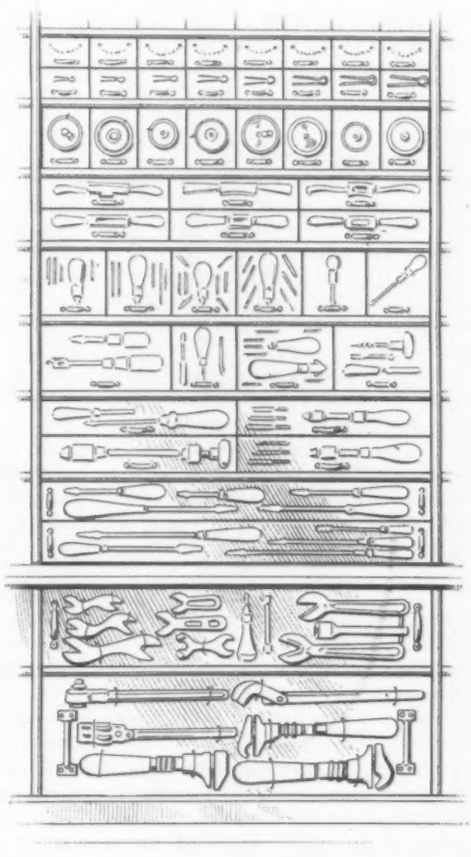


Fig. 7.—Section of Shelving, Showing Variety of Drawers and Shelf Boxes.

Handle and Ratchet Screw Drivers, Automatic Drills, Spoke Shaves of various kinds, a large variety of Measuring Tapes and Brass and Iron Safety Chain, in the order

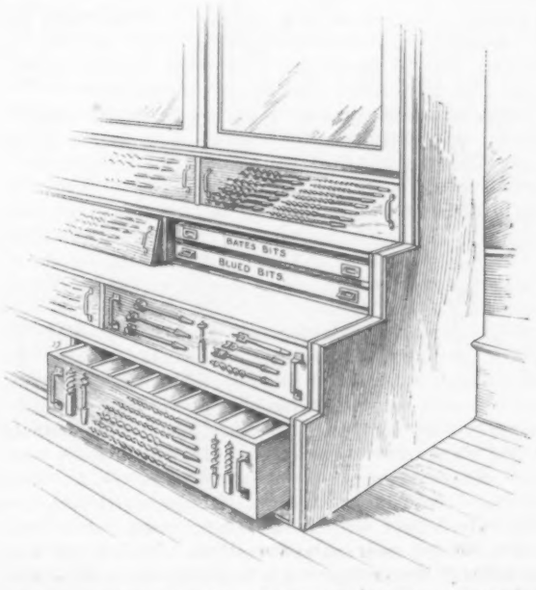


Fig. 8.—Ledges Stepped to Facilitate Reaching Shelving.

named. Every compartment, it should be remembered, presents a background of green with yellow border, as represented in Fig. 5.

THE LEDGES BELOW THE SHELVING

are illustrated in Fig. 8, a side view being presented to show how they are stepped to facilitate reaching the goods on the shelves without employing the rolling store ladders. The depth of the drawers in the upper ledge is about 13 inches, lower ledges affording an increasing depth of 18, 24 and 26 inches, respectively. The rolling ladders, which, of course, are necessary for reaching the

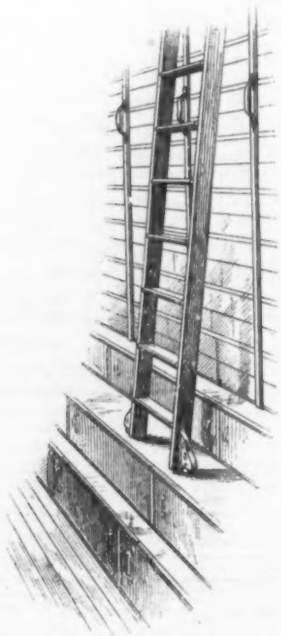


Fig. 9.—Rolling Ladder Running on Ledge with Pulls for Operating It.

highest shelves, are nicely set up to run on the second ledge rather than on the floor, so as to be entirely out of the way. This arrangement is illustrated in Fig. 9, which also shows the brass pulls fixed on the upright partitions of the shelving, by which a man on the ladder can conveniently pull himself along. There are two rows of these pulls at different hights, so as to have them within reach from any part of the ladder.

(To be continued.)

ORTON HILL.

ORTON HILL, who has acceptably represented the Reading Hardware Company's large line on the road for over 30 years, has concluded to take a well-earned rest from the exactions of continuous traveling, having resigned his position with the Reading Company, April 1. Mr. Hill began traveling as a salesman for Brown, Hinman & Co., Columbus, Ohio, manufacturers of steel, in October, 1873, and so continued until February, 1876, when he took on the Reading Hardware Company's line, traveling for the two firms and selling both lines for a number of years, and until the Hardware portion increased, so that he ceased to represent Brown, Hinman & Co. and devoted his entire attention and time to the goods of the Reading concern. His territory included such cities as Pittsburgh, Cleveland, Detroit, Milwaukee, St. Louis, Louisville, Cincinnati and other important towns. Mr. Hill still lives in Lowell, Mich., where he has lived all the years he represented the Reading Hardware Company and where he has for some years been president of the City Bank of Lowell, in which he owns a controlling interest. His geniality has won and retained host of friends, being respected for his straightforward and upright qualities and popular with the traveling fraternity in his territory as well as with his customers. In fraternal organizations he is well known as a Knight Templar and Shriner. In what will be still a busy and useful life, though no longer spent on the road, Mr. Hill will have the congratulations and good wishes of many friends.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

BEECH NOVELTY COMPANY, Mansfield, Ohio: Circulars referring to Beech Mop Wringers and Buckets, combined and improved Twentieth Century Washing Machines.

B. C. MILAM & SON, Frankfort, Ky.: Catalogue of "Frankfort, Kentucky," Fishing Reels, with historical sketch, information as to care of Reels and testimonial letters.

WILCOX, CRITTENDEN & Co., Middletown, Conn.: Catalogue of Special Fittings for Launches and Motor Boats.

TRIMONT MFG. COMPANY, Roxbury, Mass.: 1906 catalogue of Trimo Pipe Tools and Accessories, with report of mechanical tests made by the Ordnance Department of the United States Army at the Watertown Arsenal.

METROPOLITAN ENGINEERING COMPANY, 27 Sixth avenue, Brooklyn, N. Y.: Electric Sign catalogue No. 101, with article and table showing cost of operating various types; also March number of Bulletin.

THEO. J. ELY MFG. COMPANY, Girard, Pa.: Catalogue of Hardware and Wooden Ware Specialties, including Mops, Clothes and Towel Racks, Waffle Irons, Horse Pokes, Hay Knives, Saw Handles, &c.

ACME BALL BEARING COMPANY, Chappaqua, N. Y.; Sales department with Smith and Hemenway Company, 296 Broadway, New York: Illustrated catalogue No. 7, describing in detail eight series of the powerful Acme Ball Bearing Jacks, weighing from 2 to 175 pounds each, lengths closed 5 to 36 inches, inclusive, and having a guaranteed lifting capacity of 2 to 45 tons, although greater weights have been raised.

MARK MFG. COMPANY, Chicago: Illustrated catalogue No. 9, of Drive Well Points, Well Strainers, Pump Cylinders and Leathers, Artesian and Tubular Well Cylinders, &c.; Pipe Cutters and Vises, Merchant Pipe, Casing and Tubing and Repairs.

PULLMAN MFG. COMPANY, Rochester, N. Y.: Circular illustrating Sash Balances, Coil Spring Curtain Rods, Ventilating Sash Locks, Sliding Window Screen Springs, Automatic Window Ventilators, Spring Door Holders, Spring Floor Hinges, Sash Cord, Chain and Ribbon, Wire, Ribbon and Weight Attachments, Coil Door Springs, Pneumatic Screen Door Checks, Steel Sash Pulleys, Garment Hangers, Rods and Loops.

TEMPLETON, KENLY & Co., Chicago: Illustrated catalogue of Simplex Car and Track Jacks.

WESTINGHOUSE ELECTRIC & MFG. COMPANY, Pittsburgh, Pa.: Handsome illustrated catalogue of Westinghouse Electric Desk, Bracket and Ceiling Fans and parts.

OHIO TOOL COMPANY, Columbus, Ohio, and Auburn, N. Y.: Illustrated catalogue and price-list No. 22, referring to Planes, Chisels, Auger Bits, Drawing Knives, Handles, Bench Screws and other Wood and Edge Tools.

AMERICAN LAVA COMPANY, Chattanooga, Tenn.: Cards referring to the Alco Acetylene Burner and Talc Foundry Facing.

REFERRED TO OUR READERS.

SYSTEM FOR HANDLING ORDERS.—A correspondent of *The Iron Age* writes inquiring with regard to some system of handling retail orders to be delivered and charged. For instance, suppose an order comprising several items is left with a clerk with instructions to deliver next day. How should entry be made and how should it be followed up? Can an ordinary order book be depended upon or is there some more modern and systematic method comprising carbon sheets or the like? Perhaps some of our readers will give us the benefit of their ideas and practical experience.

F. E MUZZY ON PARCELS POST.

AN interesting address was delivered by F. E. Muzzy of the J. Stevens Arms & Tool Company, Chicopee Falls, Mass., before the Springfield Board of Trade, Springfield, Mass., on the 30th ult. The subject was "Parcels Post" and Mr. Muzzy made a vigorous argument in opposition to the measure. We make the following extracts from his address:

I am opposing this measure not from a selfish business standpoint, for if the proposed Hearst bill should become a law and 11 pounds could be sent to any part of the United States for 25 cents we could more profitably sell our firearms direct to the consumer delivered and at a lower price than we now do through the jobbers and retailers, but it would mean an entire change of our business methods, increasing our office force from 45, our present number, to at least 500, and the changes would be so radical we are loath to even contemplate them.

The proposed bill to carry merchandise at a rate noted above—11 pounds for 25 cents—would drive at least one-half of the retail merchants in the small cities, towns and villages out of business within ten years and centralize the population in the now overcrowded large cities, a menace to our nation, which our President has referred to in no uncertain terms, sounding an alarm that we all should heed.

IT IS FALLACY TO THINK

for a moment the proposed bill would help the small merchants. The only protection they have to-day on many goods is the differential between freight and express. If the consumer can get packages delivered at his door in small lots at a less rate per pound that the merchants can get deliveries by the ton, then the small merchant is down and out, for the large distributers will spring up in every large city and be able to sell at practically the small merchant's cost and deliver the goods as cheap 1000 miles away as the local merchant can 3 miles from home by the proposed parcels post.

The farmer depends on the local merchants to take his produce. He never can profitably send at different seasons to distant markets a dozen eggs, a few pounds of butter, some lard, a pig, a calf, a cow, a load of grain, a chicken, a few vegetables and the 101 things he depends on his local merchant to sell for him or exchange for merchandise. A farmer's market gone, what does it profit him if he can buy his merchandise in a distant city at a slightly lower price?

How can the same business man expect the Government to do work at a loss to favor a certain few or even the many? Is it a reasonable common sense proposition to require the Government to carry 11 pounds of merchandise 3000 miles at the same rate that it would charge for carrying this same package only 3 miles? Would it not be just as reasonable for a clothing merchant to mark his $5, $10, $15, $20, $25 and $30 suits all to sell at $15 and expect an average profit?

We all know it costs the Government on an average 7 cents per pound to carry mail. Is it reasonable to suppose that by increasing the quantity the cost would be reduced two-thirds or to approximately 2 cents per pound? Is it not common sense that the Government should charge at least actual cost for service rendered?

THERE IS NOW A DEFICIT

of practically $15,000,000 annually in the Post Office Department, and this is due wholly to favors extended to publishers, and the rate of 1 cent per pound extended to them, originally intended for educational media, has been so grossly abused and taken advantage of that it is time the Government should receive actual cost for doing this work.

The low second-class rate, originally intended to improve educational conditions among the poorer classes, and especially those living far from towns and cities, by making a low rate to publishers on newspapers and periodicals that it was supposed would be educational media—of great value to the reading public—has been taken advantage of by a class of publishers who flood the country with matter of all kinds, such as gift schemes, obscene pictures and literature, patent medicines for private diseases and nostrums of all kinds, working serious injury to mind and body of the very people the measure was intended to benefit.

The Government is now carrying nearly 350,000 tons of publishers' mail at a loss of practically $50,000,000 annually, and if the Postal Progress Reform League is so eager to do good for the people of this nation, why, instead of trying to plunge into deeper troubles, not propose some way to wipe out this deficit and give us a 1-cent postal rate on first-class mail, which now costs us about $2 per pound for the carrying, or a profit nearly 30 times the actual cost to the Government.

OUR PARCELS POST ADVOCATES

cite foreign countries to prove what a grand thing the proposed bill would be for this country, but they fail to state that in the United States the average haul of a letter or parcel is 442 miles, in England 40 miles; that the population in the United States is approximately 25 to the square mile, and in England about 500; that in the United States in 1903 we had 507,774 miles of mail routes and England 4300. In 1903 the United States, with nearly 30 times the railroad mileage of England, Ireland, Scotland and Wales, only carried one-half the number of passengers as did the latter, making a difference per mile of 60 times, hence comparing foreign countries to our own on parcels post matters is like comparing a Stevens target rifle with a bow and arrow, and for any one to make unjust comparisons or unfair statements regarding a subject as vital as this should prove conclusively that he is sadly lacking in honest facts and his own arguments should condemn him. And when such a person tells you that he has the good of this country or its people at heart you feel that he is preaching both hypocrisy and sophistry.

If they honestly desire to do this people and our nation good, let them work for a 1 cent per ounce first-class rate, at least a 7 cents per pound second-class rate and a way to make the rural delivery routes self sustaining, which were inaugurated in 1892 with an innocent $10,000 amendment tacked on to the appropriation bill.

THE PRESENT POSTAL LAWS

are by no means perfect, but let us try when changes are made to strive for such changes as will work the greatest good for the greatest number and not for the betterment of the few to the detriment of the many. We may often differ in our ideas, but we should respect every one who is honest in his statements and fair in his arguments. As the present postal rates at 1 cent per pound on second-class matter have practically driven the old-time book store out of business, so would the proposed carrying of merchandise by the Government at a loss ruin the country merchants, one of the mainstays of our national prosperity.

Let us seriously reason together, for we are all vitally interested in questions that have so great a bearing on the prosperity of our nation. We should all work together for the repeal of the unjust laws and the enactment of the just and the prevention of new measures that would be a blot on the statute books. To me the proposed parcels post bill appears unfair, unjust, unreasonable and a decided menace to the prosperity of our people as a whole.

GILBERT & BENNETT MFG. COMPANY.

THERE was a meeting of the directorate of the Gilbert & Bennett Mfg. Company at their offices in Georgetown, Conn., April 2, when a number of vacancies in the executive staff, resulting from the recent death of Edwin Gilbert, were filled. Major David H. Miller, who has been closely identified with the company for over 50 years and for some years its vice-president and treasurer, was chosen president to succeed Mr. Gilbert. Samuel H. Miller was elected vice-president and William H. Hunter, who has been connected with the company for over ten years, was selected to fill a vacancy in the Board of Directors.

Fiedtke Bros. Company, Toledo, Ohio, is adding a Hardware department to its other lines of merchandise.

FACTORY COST AND BUSINESS METHODS.

A SUCCESSFUL PREMIUM SYSTEM.

THE premium system of wages has not yet obtained great vogue in the United States, though in England it has been adopted by many manufacturers who find its workings most satisfactory. It combines advantages of the hourly wage and the piece work system. It is similar to profit sharing, the principal difference being that the workman receives his profit at the end of the week instead of at the end of the year. An excellent illustration of the working of the system is found at the shops of the Worcester Loom Company, Worcester, Mass., manufacturer of looms, where it has been used for several years in a considerable part of the production, though not to the exclusion of day labor.

In considering the system as adapted by Clinton Alvord, president and treasurer of the company, it may be advisable to take up

The General Theory

of premiums. The daily wage and the piece work systems are familiar to all manufacturers. The premium system is not understood by many; in fact, it is misunderstood. We will suppose that day wages have been paid and a premium system is to be established. The workman continues to receive his old daily wage rate, and is told that if he will reduce the time taken to accomplish certain work he will receive in addition to his regular wages a premium for all time saved over an arbitrary time set by his employer for the work. The premium per hour must always be

Less Than the Hourly Wage,

this being the essential principle of the system, because the money saved must not all go to the workman, the employer taking his share. Usually the workman gets one-third and the employer two-thirds of the saving. To illustrate the point, we will presume that a workman is paid $3 a day in regular wages, and produces one piece of a kind in a day of ten hours. He is told that he will continue to be paid his $3 a day, and that if he will reduce the time taken to do the work on the piece he will be paid in addition to his wages a premium of 10 cents an hour for each hour saved. This amount is larger than is usually paid, but is taken in the illustration as easy to reckon with. If the workman reduces the time an hour, that time represents in money value a gross saving of 30 cents. Of this amount 10 cents goes to the workman, 20 cents to the employer. In other words, the man's wages go up and the cost of production goes down.

Mr. Alvord's Table.

Mr. Alvord has prepared a table based on this hypothetical scale to illustrate the theory which he has put into practice. In it is demonstrated the important bearing which the burden or general expense has on the cost system under the premium plan of wages. The method of

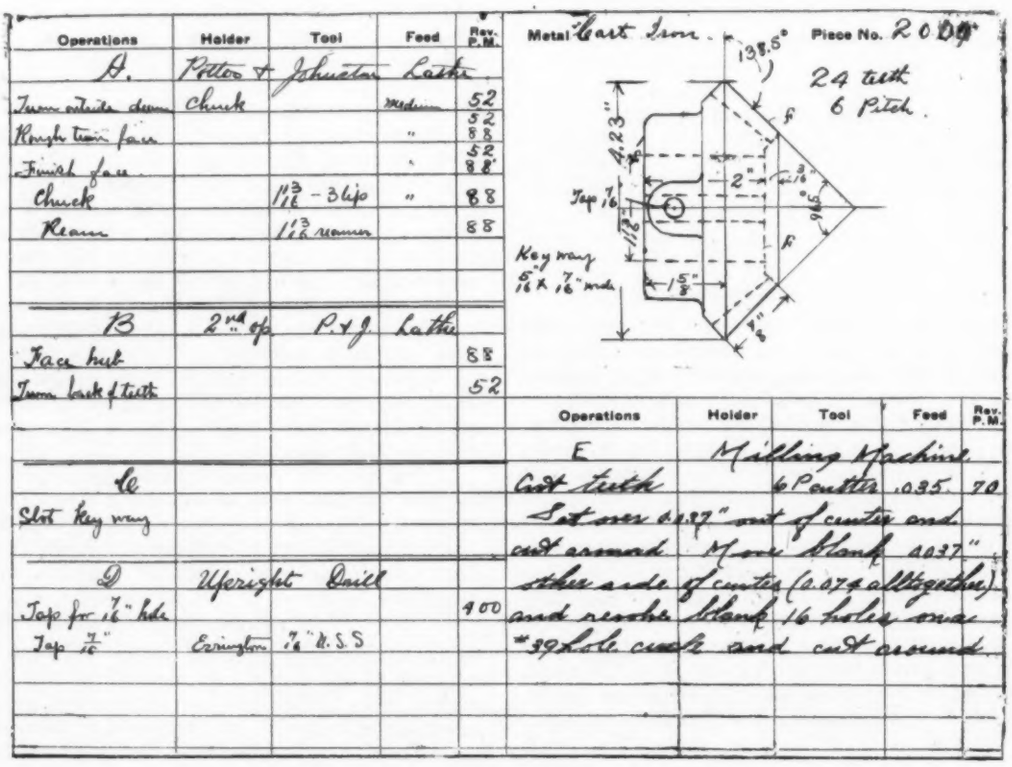


Fig. 1.—Blue Print Chart Giving Directions for Job.

ascertaining this burden per productive hour is treated of later in this article. The table is as follows:

Table Showing the Relation of the Burden or General Expense Under the Premium Plan of Wages.

Time consumed.	Wages per piece.	Premium.	Total cost of work. Columns 2 and 3.	Workman's earnings per hour. Columns 4 and 1.	Burden at 16 cents per hour.	Total cost.	Percentage saved.
10 h'rs.	$3.00	$0.10	$3.00	$0.30	$1.60	$4.60	0 %
9.....	2.70	.10	2.80	.311	1.44	4.24	7.8 %
8.....	2.40	.20	2.60	.325	1.28	3.88	12.6 %
7.....	2.10	.30	2.40	.343	1.12	3.52	23.5 %
6.....	1.80	.40	2.20	.366	.96	3.16	31.3 %
5.....	1.50	.50	2.00	.400	.80	2.80	39.12 %

Thus, when the time of production of the piece work has been reduced to five hours the total wage cost has been decreased one-third and the man's wages have been increased one-third. The employer makes the additional gain due to the increased production of his plant, which reduces the burden cost, but the piece work system produces the same saving in this respect. As to the premium rate, some shops divide the money saved, others give a fixed percentage of the wage saved, say 40 or 50 per cent. The simpler plan and that adopted by Mr. Alvord is to establish a

Flat Rate Per Hour,

the figure being 7 cents, which he considers high enough to produce results. To quote Mr. Alvord as to the rate of premium: "The rate is the first thing to be determined. Pay what is necessary in order to get what is wanted, but pay no more. We must offer an inducement large enough to encourage the workman to gain it. If

the time limit is too low he will not try for it; if it is too high you are throwing away money. Never cut the time limit unless the system of doing the work is changed. If a piece of work has been done in a boring mill with one tool and a new and improved double tool boring mill is installed, the time should be changed, but care should be taken to allow the workman to make more money on the new machine than on the old. To cut the time or rate is to kill the goose that lays the golden egg. The premium plan does not prevent rate cutting, but it makes it unnecessary and unprofitable."

It is frequently doubted that the

Workman Can Cut Large Slices

from the time required under day work to accomplish a certain piece of work, provided his superintendent and foreman know their business, and criticism is made by employers that a time limit for work which the workman can cut in three should never be set. The pride of superintendents and foremen is sometimes hurt when they see the result of ambition on the work of men performing tasks which are familiar to the shop. This ambition need never be chilled by cuts which constitute the real weakness of the piece system. A friend of Mr. Alvord, a tool maker, visited his shop. A workman was doing a job of drilling and counterboring. A hub had cored bosses with holes for six arms, and he must drill and ream the holes 1¼ inch and counterbore the ends of the bosses. The friend looked the job over and gave it as his opinion that two hours was good time for the work. The first time the job was done it occupied 2 hours and 24 minutes, when four hubs were run through. The first premium

Order No. 40 — Job No. E

1904 Started — Left off — Quantity 11 — Piece No. 2009

Month	Day	Hour	Month	Day	Hour
Jan.	9	7	Jan.	9	5.20

Workman L.A. Raymond '19

Hour Rate 15c T. hs.wk.	7	20
Hours all.one pc.	1	5
Total hrs.all.	11	55
Hours saved	4	35
Prem.per hour		7c
Prem.earned	0	32
Total	1	42

No.of Machines Operated ____ Cost one piece 0.129

Foreman ____ Remarks ____

PREMIUMS PAID ONLY ON WORK SATISFACTORY TO THE INSPECTOR

Fig. 2.—Workman's Premium Time Card.

time was 54 minutes and the time when the friend saw the work done it had dropped to 46 minutes, and since then it has been lowered to 39 minutes, when eight hubs were run through.

Another Example.

A shaft 4 inches in diameter, 7 feet 3⅝ inches long, of soft steel, weighs 326 pounds in the rough, and 98 pounds of metal had to be removed. There were several micrometer fits. When Mr. Alvord insisted that this work could be finished, exclusive of cutting off and centering in 10 hours, no one agreed with the assertion. The foreman argued that possibly it could be done in 12 hours. A time limit of 13 hours was set for the premium basis. The first man given the job wanted 20 hours, and gave up his place rather than attempt the task set for him. The first premium time was 9½ hours, and it dropped by degrees to 7½ hours, and by encouragement to 6½ hours, which was a record for several months. The foreman became disgusted when the time went back to 8½ hours, and by broader cuts the last four shafts were reduced in time to 6 and then to 5½ hours.

An Important Factor

in the premium system is the foreman. It pays to enlist his assistance by giving him a percentage of the earnings of his men. He can grind the tools, get up new and improved tools and fixtures, and help in other ways. In the Worcester Loom Company's shops the foreman receives a sum equal to 10 per cent. of what his men make by premiums. An all-important element in the premium system is

A Good Cost System.

A cost system once established, the inauguration of the premium system is not a complicated or difficult matter. Mr. Alvord's cost system is a simple one, and is said to be entirely satisfactory in its workings and its accuracy. Every piece of work has its chart, shown in Fig. 1, which is given out, in blue print, whenever a lot is to be manufactured. The chart contains specific directions as to operations, including machine to be used, fixtures, feed and revolutions per minute. The operations are separated, each having its designating letter. In addition, a general letter Z is employed for keeping account of any unusual cost which may enter into the production of the piece.

A Premium Time Card,

Fig. 2, is issued to a workman for every operation to be performed—that is, for each letter on the chart. Care is taken to give as little clerical work as possible to the foreman and workman. The latter puts down his time on the time card, subject to verification by the foreman. The foreman must see to it that the order number, piece number, letter designating the operation or job, the number of pieces to be run through, and the name or number of the workman are inserted in their respective places on the time card. The cost clerk fills out the workman's hourly wage rate, the hours allowed for one piece, the total hours allowed, the premium per hour, the hours saved, the premium earned, the total labor cost and the cost per piece. An examination of this card, which is one actually obtained in the process of business, reveals the fact that the workman saved 4 hours, 35 minutes of the time allowed, accomplishing the task in 7 hours, 20 minutes. He earned 32 cents at 7 cents an hour premium above his hourly wages.

This card is not returned to the office until the job has been finished and the work inspected and accepted. It might happen that it was not turned in at the end of the week, but this would not interfere with the making up of the payroll. The company holds back one week's pay, and the clerk in charge of the payroll would rarely have to go into the shop to procure from the foreman the workman's time for the previous week because the job had not been completed and the card had not been returned to the office.

(To be continued.)

MISCELLANEOUS NOTES.

Moore Electric Daylight.

The Moore Electric Tube Light is one of the latest methods employed for lighting offices, stores, factories, show windows, halls, churches, libraries, theatres, steamships, &c., especially where a large volume of soft light is desired, which, however, can be regulated from a faint glow to 20 or more candle-power per foot, the latter producing an extremely brilliant illumination. The Moore loop tube system of the Moore Electrical Company, 52 Lawrence street, Newark, N. J., is the result of an electric current being conducted inside of a glass tube by a very small quantity of a nonmetallic gas. The apparatus for this system consists of the tube and a small terminal box securely enclosing both ends of the tube with a potential raising transformer. The size of the tube can be varied in diameter from a fraction of an inch to several inches, and in length from a few inches to hundreds of feet, in which instance the tubes are put together on the premises and bent to any shape desired. An installation in an average store, for example, consists of a continuous glass tube, about the size of the wrist, placed on the four walls at about the hight of the picture molding and therefore out of the direct line of vision. An alternating current from street mains, ordinarily used for incandescent lamps, operates this electric tube light,

or when direct current is the source a dynamotor is utilized. The maintenance cost of any individual tube or lamp depends not only on its length, but also on the color used, because different gases or vapors vary in their spectrums and also in their efficiency. Cardinal features of this light are its mellowness and uniformity and the fact that it can be stared at without dazzling the individual. Very little wiring being necessary eliminates, the company says, about 90 per cent. of the danger incidental to concealed wiring. The heat from this light is said to be a negligible quantity and the color can be made anything desired, from a duplication of average natural light to the special tints most suitable for photographic purposes, or signs and spectacular lighting. Portable forms are used for windows, artificial skylights, advertising signs and other situations requiring special treatment.

Tap Wrench and Hand Vise.

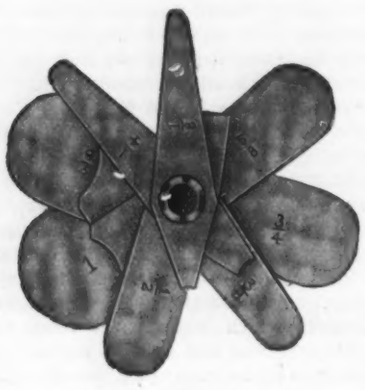
M. W. Robinson Company, 79 Chambers street, New York, manufacturer of mechanics' fine tools for wood and metals, has just added the Robinson No. 10 tap wrench and the Rollis hand vise to its line. The tap wrench is made of polished steel, with fixed, round T-handle, the handle being 7-32 x 4 inches. The one-piece shank, ½ x 2⅞ inches, is threaded for ⅝ inch for the knurled steel sleeve, which is ⅝ inch outer diameter, so that the shanks of small taps to ¼ inch diameter are gripped securely as the sleeve is rotated against the four one-piece jaws or chuck. The Rollis hand vise is a useful tool, capable of being sold at a moderate price. It is 6 inches long over all, having a hardwood brass ferruled handle 3¾ inches long and 1⅛ inches greatest diameter, in shellac natural finish. The jaws and side wing nut are steel castings, oil finished, the top and sides of the jaws being polished. The wing nut for tightening jaws moves on a ¼-inch partly threaded rod fixed permanently in the sliding jaw, the latter traveling back and forth on an upper plain steel rod 3-16 x 1⅝ inches in stationary jaw, which, with an additional grooved bearing at base of sliding jaws, prevents lateral motion. The jaws themselves are 1¼ inches wide, and in one there is a small half diamond notch to better hold a round pin or other piece of metal being worked.

Atlas Bolt and Screw Company.

Atlas Bolt & Screw Company, Cleveland, Ohio, is now prepared to furnish the trade with a line of standard size washers for bolts up to and including ½ inch diameter. The company states that it will carry these goods in stock so as to ship all orders promptly on receipt.

Concave and Convex Gauge.

A tool of obvious utility is being put on the market by Patterson, Gottfried & Hunter, 146-150 Centre street, New York. It consists of eight tempered steel gauges measuring from ⅛ to 1 inch wide, held together by a central rivet, as shown in the accompanying cut. One end of each gauge is accurately ground to measure a concave circle, the diameter of which is stamped upon it, while the other end measures the convex arc of the same size circle. The makers state that this tool serves as a guide for turning work accurately in a lathe and enables a workman to make absolute duplicates. They refer to it as essential to pattern makers and suggest that other uses will occur to machinists, as, for example, grinding round nose tools.



Concave and Convex Gauge.

Fox Improved Square and Miter.

The Fox adjustable square and miter, with sliding blade, shown in the accompanying cuts, is the product of Philo L. Fox, 432 William street, Bridgeport, Conn. As described by the manufacturer the stock or handle is made of best gray iron, japanned, the blade of polished steel and the tool, though light, is durable and fully warranted. Its advantage lies in the fact that the miter blade is so placed at one end of the handle that it forms a complete square and bench square without a single change, as shown in Fig. 1. Fig. 2 indicates the adjustment of the sliding blade, which runs from 5 to 8 inches, making a full set of squares in one. The long or square blade can also be adjusted in place of the short blade,

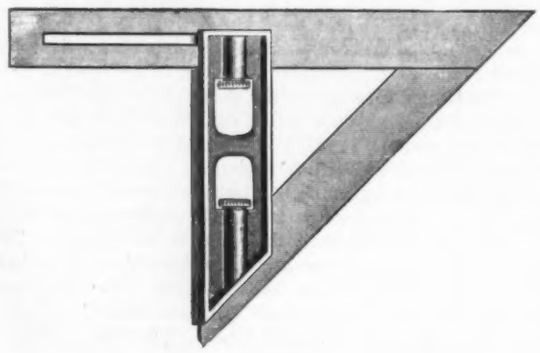


Fig. 1.—Square Miter and Bench Square.

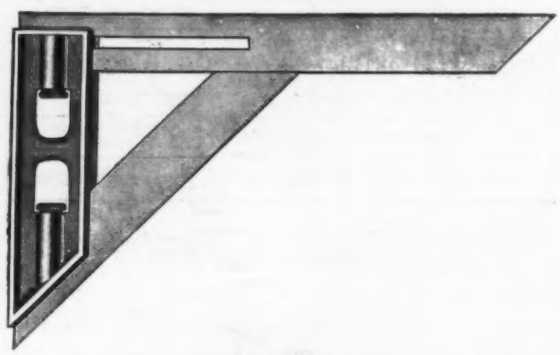


Fig. 2.—Square and Miter Adjusted to 8 Inches.

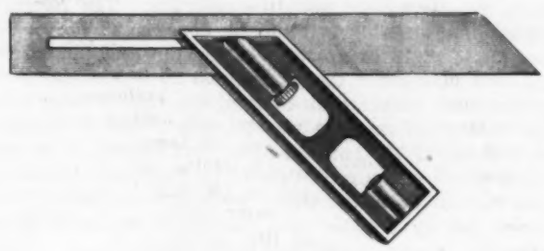
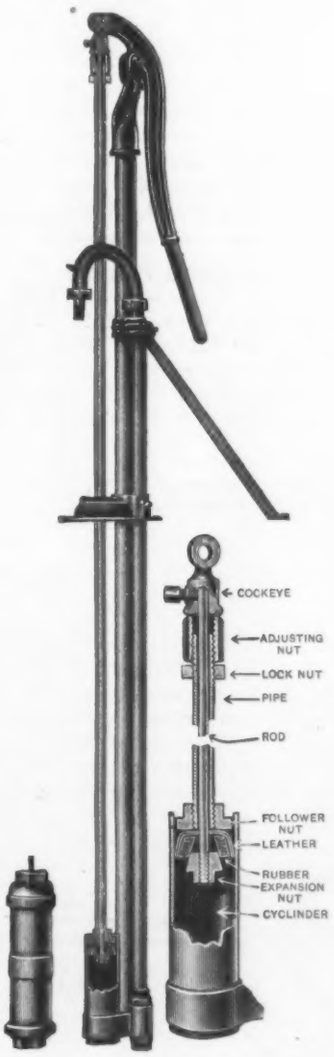


Fig. 3.—Miter Square with Sliding Blade.

thereby affording a miter square with sliding blade, as shown in Fig. 3. The tool can be used for laying off miters up to 10 inches, as well as for outside and inside miters.

Double Acting Pump with Expansion Plunger in Upper Cylinder, Fig. 380.

The accompanying cut represents Porter's Fig. 380 double acting pump, with new expansion plunger in upper cylinder. It is explained that when the leather in the upper cylinder of a double acting pump becomes worn or from other causes does not hug the wall of the cylinder tightly the cylinder leaks, the overflow running back into the well, thereby materially decreasing the flow of water from the spout. By the use of this expanding device this difficulty is said to be entirely overcome by simply turning the adjusting nut up; this forces the

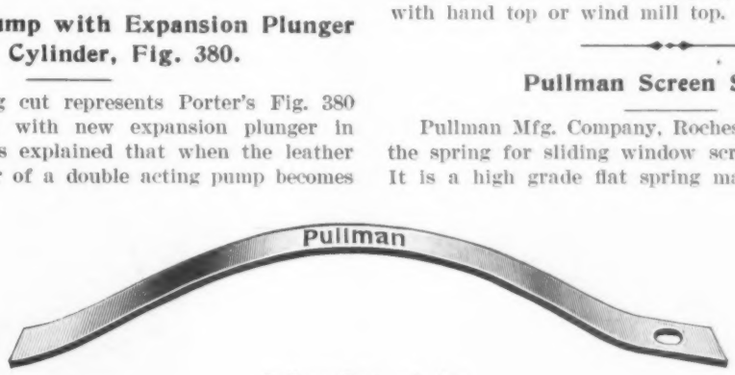


Double Acting Pump with Expansion in Upper Cylinder, Fig. 380.

⅜-inch pipe, which incases the rod, down against the plunger, the lower part of which is a metal cone, and against which the rubber expander is pressed, forcing the leather uniformly against the walls of the cylinder. The amount of expansion is entirely under the control of the operator, being regulated above the platform and without removing the pump or any part thereof, a matter of great importance. The adjusting nut, it will be noticed, is located at the top of the plunger rod. This new device is now attached to all double acting pumps made by the J. E. Porter Company, Ottawa, Ill., whether with hand top or wind mill top.

Pullman Screen Spring.

Pullman Mfg. Company, Rochester, N. Y., is offering the spring for sliding window screens shown herewith. It is a high grade flat spring made from best quality tempered Bessemer steel and is 5 inches long and ¼ inch wide. It is designed to be placed out of sight in the side of screens, to hold them at any desired point, but still permitting them to be freely and readily moved. It is explained that one or two springs may be used as desired, but that one is sufficient for small screens.



Pullman Screen Spring.

Pneumatic Gas Lighter.

The Pneumatic Gas Lighting Company, 150 Nassau street, New York, has put on the market the Pneumatic gas lighter here illustrated. This constructive principle enables an individual to control any number of lights in a room or building by means of a single push button, and if required the same group of lights can be controlled from other push buttons placed anywhere else, while the lights in the system can be ignited or extinguished simultaneously or individually by merely pushing or pulling the push button more or less. In this apparatus there are but two moving parts, the piston in the push button or pump and the valve in the lighter, the latter being a section of brass rod about 3-16 inch diameter and about 1 inch long. The push button or pump has a mahogany finish wood base and button in connection with a nickeled brass piston, a movement of which compresses or exhausts the air in flexible and ductile brass tubing only 5-64 inch outside diameter, which, like small insulated electrical wire, can be run and stapled inconspicuously or entirely hidden. In installing the push button the outer portion is unscrewed from the base so that the latter can be screwed securely in position, after which the remaining section can be replaced. If necessary two or more of the neat little pumps can be placed at convenient points by using small connections for this purpose up to six-way connections, inclusive. Thus any light or group of lights

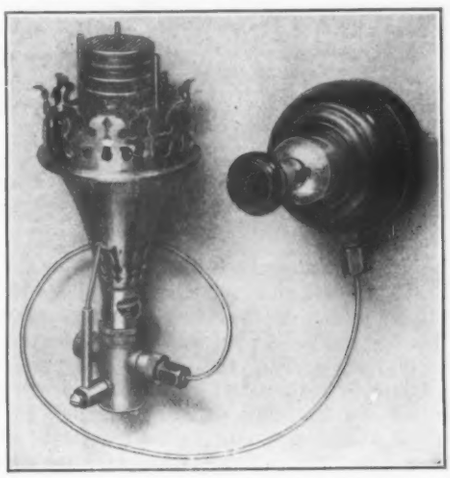


Fig. 1.—Pneumatic Gas Lighter for Incandescent Burners.

within the capacity of the several sizes of pumps can be ignited or extinguished simultaneously or in consecutive order according to the delicacy of pull or push, one pull lighting all, for example, while a fraction of the same travel would light or extinguish each in order according to distance of burner from button, the impulse to reciprocating piston valve in lighter being governed by the compression or exhaustion of air in the tubing. As

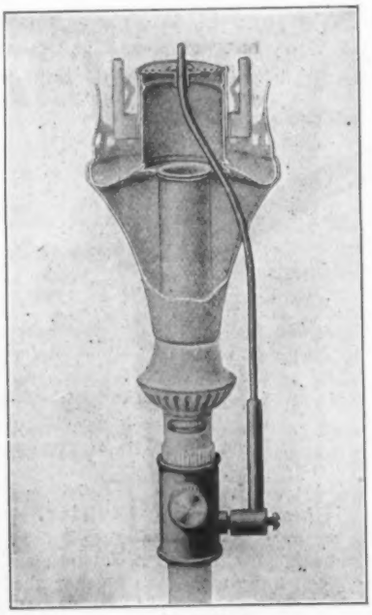


Fig. 2.—Lighter and Burner Combined, Sectional View.

the button is moved so is the valve piston, which allows gas to pass either into the small pilot tube or into the larger gas way to feed the larger flame. Some of the advantages claimed by the manufacturer for this construction are the minimizing of danger from fire near curtains, draperies and other inflammable materials by the non-use of matches, the great saving in incandescent mantles and the ease and rapidity with which a light can be safely obtained. As the small pilot light, using but about 1 cent's worth of gas per month, burned all the time, is in the center of the mantle and close to the burner, there is not the usual explosion so destructive to mantles, as the fast flow of gas is ignited by it before enough has accumulated in the mantle to affect it injuriously. In this system the reciprocating piston in lighting attachment is grooved at right angles with its length, which permits of its being reversed, one result of which is that the burners can be so arranged in different rooms that a pull simultaneously extinguishes one or more lights in one room and ignites one or more somewhere else if desired. There are also two screw caps, so that the rod piston can be pushed out if from a poor quality of gas it become clogged. The lighter will work with any kind of illuminating gas. The type A lighter for indoor use only is adaptable for any style of incandescent gas light burner, including inverted types. Type B is for any style of noncarbonizing acetylene burner. The company issues a pamphlet of detailed instructions for installing the device which is fully illustrated and contains diagrammatic plans for installing lights in groups of one to five, inclusive. Where the installation is by the company's own force the working parts are guaranteed indefinitely and replaced gratuitously if necessary. Pumps having capacities up to three, five and seven lights, respectively, can be supplied regularly, those of greater capacity being furnished to order. Wire is obtainable in coils up to 300 feet in one piece, and even longer, either in plain brass, nickeled finish or cotton covered similar to insulated electrical wire. Other accessories available are two, three, four, five and six way connections, cones, nuts and washers for locating pumps at convenient points in a single group, according to the wishes of the individual. This device can be installed by any layman possessed of enough mechanical skill to avoid kinking or closing the tubing by making a careless right angle turn or driving a staple on tubing too tight. For jointed wall brackets in kitchen, cellar, storeroom, &c., one or two small coils will permit of its being turned without injury to air duct.

Fig. 3.—Pneumatic Gas Lighter or Attachment, Proper.

Niagara Beaters.

C. K. Hutchins Company, Buffalo, N. Y., represented in New York by the Bridgeport Wire Goods Company, 82 West Broadway, has recently put on the market the No. 8 Niagara carpet beater and the No. 9 Niagara beater for light articles, both of which are illustrated herewith.

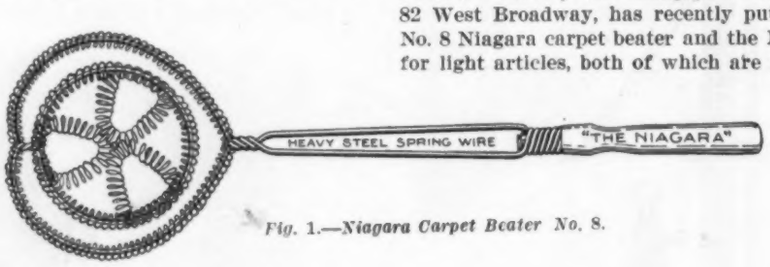


Fig. 1.—Niagara Carpet Beater No. 8.

The carpet beater shown in Fig. 1 is made with a varnished hardwood handle, around one end of which are coiled and wedged two strong steel coppered wires 5-32 inch in diameter. With the larger wire for a framework, smaller wire about 1-32 inch in diameter is coiled in ½-inch diameters, so that in the process of beating there is a flexibility and springiness throughout the operation. The diameter of the beating surface is 9 inches, and all of the beater to and including the twist of the heavy wires is retinned after the article is made. The No. 9 beater, Fig. 2, is lighter in every way, although made in much the same general manner, being 20 inches long over all and retinned to the twist of the two main wires.

Fig. 2.—Niagara Beater No. 9, for Light Articles.

Diaphragm Force Pump.

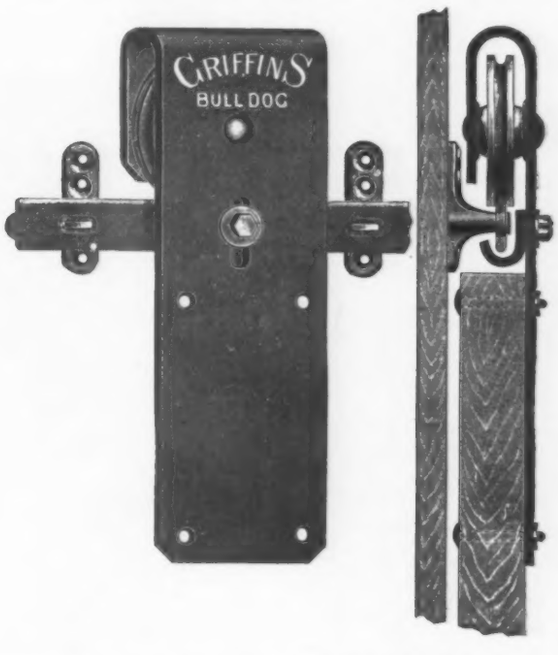
The Goulds Mfg. Company, Seneca Falls, N. Y., is placing on the market a diaphragm force pump, shown herewith. It is designed especially for pumping out cesspools, vaults, sewers, &c., or for moving any semi-liquid matter in such a manner as to be perfectly sanitary and odorless. The pump is also designed for water companies in testing mains, as well as for use in sinking

Diaphragm Force Pump.

poles and piles in sandy localities for weirs, fish nets, wharves and cofferdams. For this purpose 10 feet of suction and 25 feet of discharge hose are required. The discharge hose is coupled to 8 feet of galvanized iron pipe, which is secured by staples to the pole, pile or plank to be sunk, the sinking being referred to as rapid. A rubber diaphragm in the pump, with special valve, acts as plunger. The valve seat is of bronze. The inclined rubber faced suction valve is alluded to as offering the least obstruction to passage of matter. The levers are wrought iron and reversible. The stroke is short and operates easily. The pump has a convenient hand hole for getting at the interior without removing the air chamber, and has a capacity of 1½ gallons for each stroke. The suction and discharge connections are 3 inches in diameter.

Heavy Barn, Warehouse and Fire Door Hanger

The main frame of the hanger shown in the accompanying cut is made of one piece of heavy plate steel and is long enough to give a good bearing on the door. The wheels are extra heavy, semisteel castings, carefully centered and bored, and are provided with hard steel roller bearings and washers to make them antifriction on any length of run. The guard is adjustable to any



Heavy Barn, Warehouse and Fire Door Hanger.

width of track and is to prevent the hanger from jumping the track. The hanger is made by the Griffin Mfg. Company, Erie, Pa., and is designed especially for use with the Erie King track made by the company, but also can be used with the common hinge hanger track. The hanger is furnished in hard, black baking enamel finish and is packed one-half dozen pairs in a case.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal
Linseed, City, raw	.42 @43
Linseed, City, Boiled	.43 @44
Linseed, State and West'n, raw	.39 @40
Linseed, raw Calcutta seed	@65
Lard, Extra Prime, Winter	.70 @71
Lard, Extra No. 1	.48 @49
Lard, No. 1	.38 @40
Cotton-seed, Crude, f.o.b. mills	28½@30
Cotton-seed, Summer Yellow, Prime	34½@35
Cotton-seed, Summer Yellow, off grades	@..
Sperm, Crude	.52 @53
Sperm, Natural Spring	@..
Sperm, Bleached Spring	@..
Sperm, Natural Winter	.61 @64
Sperm, Bleached Winter	.64 @66
Tallow, Prime	.51 @53
Whale, Crude	.31 @32
Whale, Natural Winter	.38 @41
Whale, Bleached Winter	.40 @42
Extra Bleached Winter	.44 @46
Menhaden, Brown, Strained	.26 @29
Menhaden, Light, Strained	.27 @30
Menhaden, Bleached, Winter	.32 @33
Menhaden, Ex-Bld., Winter	.34 @35
Menhaden, Southern	@..
Cocoanut, Ceylon	℔ lb 6¼@ 6¾
Cocoanut, Cochin	℔ lb 7¾@ 8
Cod, Domestic, Prime	.33 @35
Cod, Newfoundland	.36 @39
Red, Elaine	.35 @37
Red, Saponified	℔ lb 4¾@ 5
Olive, Italian, bbls	.57 @60
Neatsfoot, prime	.68 @69
Palm, Logos	℔ lb 6¼@ 6½

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	10¼@11¼
Black, 29 gravity, 15 cold test	11¼@12¼
Black, Summer	10½@11¼
Cylinder, light filtered	.18 @19
Cylinder, dark filtered	.16 @17
Paraffine, 903-907 gravity	13¼@14
Paraffine, 903 gravity	12¼@13
Paraffine, 883 gravity	10¼@10¾
Paraffine, Red	12½@14

In small lots ½¢ advance.

Miscellaneous—

Barytes:		
White, Foreign	℔ ton	$17.50@19.00
Amer. floated	℔ ton	18.00@19.00
Off color, No. 2	℔ ton	13.50@15.00
Chalk, in bulk	℔ ton	3.00@ 3.25
Chalk, in bbls	℔ 100 lb	....@ .35
China Clay, English	℔ ton	12.00@17.00
Cobalt, Oxide	℔ 100 lb	2.50@ 2.60
Whiting, Common	℔ 100 lb	.43@ .48
Whiting, Gilders	℔ 100 lb	.50@ .55
Whiting, Ex. Gilders	℔ 100 lb	.55@ .60

Putty, Commercial—℔ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.40
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—℔ gal.

In Oil bbls	.68 @68½
In machine bbls	68½@69

Glue—

	℔ lb
Cabinet	.11 @15
Common Bone	.7 @ 9
Extra White	.18 @24
Foot Stock, White	.11 @14
Foot Stock, Brown	.8 @11
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.9 @12
Medium White	.14 @17

Gum Shellac—

	℔ lb
Bleached Commercial	.40 @42
Bone Dried	.50 @52
Button	.40 @15
Diamond I	.53 @54
Fine Orange	.46 @50
A. C. Garnet	.41 @42
D. C.	.60 @..
Octagon B	@52
T. N.	.43 @44
V. S. O.	.54 @56

Colors in Oil—

	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	9½@ 9¾
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
In Barrels	@ 6¾
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½

Lead, American. Terms: For lots of 500 lbs and over 1¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	℔ lb
Lead, White, Dry, in bbls	@ 6¾
Zinc, American, dry	4¾@ 5
Zinc, French:	
Paris, Red Seal, dry	9¼
Paris, Green Seal, dry	10½
Antwerp, Red Seal, dry	8½
Antwerp, Green Seal, dry	9½

Zinc, V. M. French, in Poppy Oil:
Green Seal:
Lots of 1 ton and over 12¾@13¼
Lots of less than 1 ton 12¾@13⅜
Zinc, V. M. French, in Poppy Oil:
Red Seal:
Lots of 1 ton and over 11¾@11¾
Lots of less than 1 ton 11¾@12¼
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2½; 50 bbls., 4%.

Dry Colors—

	℔ lb
Black, Carbon	.5 @10
Black, Drop, American	.4 @ 6
Black, Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	.29 @32
Blue, Prussian	.27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.30@3.40
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	.17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
Litharge, American, bbls	@ 7¼
Ocher, American	℔ ton $8.50@16.00
Ocher, American Golden	2½@ 3½
Ocher, French	1¾@ 2½
Ocher, Foreign Golden	3 @ 4
Orange Mineral, English	.10 @12
Orange Mineral, French	10¾@12¾
Orange, Mineral, German	8½@10
Orange, Mineral, American	8¼@ 8½
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¾
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
Red Venetian, English	.100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9¼
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1¾@ 2
Talc, French	℔ ton $15.00@30.00
Talc, American	℔ ton 15.00@25.00
Terra Alba, French	℔ 100 lb 90 @1.00
Terra Alba, English	℔ 100 lb 90 @1.00
Terra Alba, American, ℔ 100 lb, No. 1	.70 @80
Terra Alba, American, ℔ 100 lb, No. 2	.60 @65
Umber, Turkey, Bnt. & Pow	2¼@ 3½
Umber, Turkey, Raw & Pow	2¼@ 3½
Umber, Burnt, Amer	1¼@ 2
Umber, Raw, Amer	1¼@ 2
Yellow Chrome	.12 @14
Vermilion, American Lead	.10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@65
Vermilion, English, Import	.75 @80
Vermilion, Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1905, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, ₱ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Eagle Anvils.....₱ lb 6¾@7 ¢
Hay-Budden, Wrought.....9@9¼ ¢
Horseshoe brand, Wrought.....9@9¼ ¢
Trenton .....₱ lb 9@9¼ ¢

Imported—

Peter Wright & Sons.....₱ lb 10¼ ¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur.....75@75&5%
Jennings' Patn., reg. finish.....50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 50, R. Jennings' list.....40&7½%
Russell Jennings .....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist....60&10%
Wright's Jennings' Bits.....50%

Bit Stock Drills— See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₱ doz. $26; No. 2, $18.....65%
Ford's, Clark's Pattern.....60&5%
C. E. Jennings & Co., Steer's Pat..25%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....45d5@—%
Ford's .....33⅓@5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's 40%

Awl Hafts— See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered..gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights:
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease— See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar...4¼@4¾ ¢
Concord, Solid Collar...4¾@5¼ ¢
No. 1 Common, Loose...3¾@4¼ ¢
No. 1½ Com., New Style3¾@4¼ ¢
No. 2 Solid Collar.....4@4½ ¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—

Common and Concord, not turned lb..4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb. 8½@9¢

Bait— Fishing—

Hendryx:
A Bait.....30%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 3@3¼ ¢

Towel -

No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—

Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ₱ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..₱ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned....₱ doz. $1.20
Holt, No. 1, Tinned.....₱ doz. $1.50
Holt, No. B, Japanned....₱ doz. $2.00
Holt, No. 2, Tinned.....₱ doz. $2.25
Lyon, No. 2, Japanned....₱ doz. $1.25
Lyon, No. 3, Japanned....₱ doz. $1.50
Taplin Mfg. Co.: ₱ gro.
No. 60 Improved Dover.....$6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd..$8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd..$17.00
No. 200 Imp'd Dover Tumbler....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ₱ doz. $25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (R. M. Co.)..₱ gro. net, $6.00

Bellows—

Blacksmith, Standard List.. 60&10@70&10%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*
Doz...	*$4.75*	*5.70*	*6.65*	*7.60*	*8.85*

Molders—

Inch..	*9*	*10*	*11*	*12*	*14*
Doz...	*$8.00*	*9.00*	*10.50*	*12.50*	*14.50*

Net Prices.

Bells— Cow—

Ordinary goods...75&5@75&10&5%
High grade.....70&10@70&10&5%
Jersey .....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—

Hand Bells, Polished Brass.60&10%
White Metal.....60%
Nickel Plated.....50&10&60%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—

Farm Bells.....lb. 2¼ ¢
Steel Alloy Church and School 50&10@60%
American Tube & Stamping Co. Gongs 75%
Table Call Bells.....50@50&10%

Belting— Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....50%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops— See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden.....70&10@75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%;
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40%
Paper Embossed.....40&10%

Boards, Wash— See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts— Carriage, Machine, &c.—

Common Carriage (cut thread): ⅜ x 6 and smaller.....75@—%
Larger and Longer..65&5@—%
Phila. Eagle $3.00 list May 24, '99 80%
Bolt Ends, list Feb. 14, '95.... 65&10@—%
Machine, ⅜ x 4 and smaller 75@—%
Machine, larger and longer.. 65&5@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz.	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.20*	*1.50*	*2.25*

Cast Iron Chain Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.00*	*1.40*	*1.85*

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.75*	*.95*	*1.25*

Wrt Barrel Japd.....80@80&10%
Wrt " Bronzed....50@50&10%
Wrt. Spring...70&10@70&10&10%
Wrt. Shutter.....50&5@50&10&5%
Wrt. Square Neck.....75@75&10%
Wrt Square 66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Plow and Stove—

Plow .....65&10@—
Stove .....87½&10@—

Tire—

Norway Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84....80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.80*	*5.60*	*6.40*	*8.00*
Inch			*2¼*	*2½*
Per doz.....			*$5.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection 40%
Seavey 33⅓%
Stanley R. & L. Co.:
Nos. 240 to 460.....30%
Nos. 50 and 60.....35%

Braces—

Common Ball, American, $1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat....50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley 35%
Victor 45%

Brackets—

Wrought Steel...80&10@80&10&5%
Griffin's Pressed Steel.....80@80&10%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods— See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—

Price per dozen.

Quart.....	*10*	*12*	*14*
Water, Regular...	*1.50*	*1.70*	*1.90*
Water, Heavy....	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom..	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—

Hoosier.....₱ gro, $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—

Wrought, list, Sept., '96..15@—%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—

	Discount.
Reversible and Broad..	*75&5%*
Light Reversible, Light Narrow	*75&10%*
Loose Joint, Narrow, L'ht Inside Blind, etc.....	*75%*
Back Flaps, Table, Chest.	*70&10%*

Extra, 10&10@—

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers— See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb. 4@4¼ ¢
Sharp, 1 prong...per lb., 4¼@4¾ ¢
Burke's Blunt.....4@4¼ ¢
Burke's Sharp.....4¼@4¾ ¢

Gautier, Blunt.....4@4¼¢
Gautier, Sharp.....4½@4¾¢
Perkins', Blunt Toe.....₱ lb 3.65¢
Perkins', Sharp Toe.....₱ lb 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern	$1.35	1.85	2.05	each.
New York Pattern	1.50	2.20	2.45	each.
Baltimore Pattern	1.50	2.20	2.45	each.
Dubuque	1.35	1.60	1.75	each.

Cans, Oil—
Buffalo Family Oil Cans:

3	5	10 gal.	
$18.00	60.00	129.60	gro., net.

Caps, Percussion—
Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—
Berdan Primers, $2 per M...80%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—
Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—
Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—
American Coil, Straight Link:

5-16	¼	5-16	⅜	7-16	½	9-16
$8.70	5.90	4.95	4.20	4.05	3.95	3.90
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.			
$3.85	3.70	3.65	3.80			

German Coil.....60&10&10@70%

Halter—
Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2¼, '97.....60&10&10%
Covert Mfg. Co.
Halter.....35&5%
Covert's Saddlery Works
Halter.....70%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—
Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring. $25.00
6½—6-2, Str'ght, with ring. $26.00
6½—8-2, Str'ght, with ring. $30.00
6½—10-2, Str'ght, with ring. $35.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60&10%

Miscellaneous—
Jack Chain, list July 10, '93:
Iron.....60&10&5@70%
Brass.....60&10@60&10&10%
Safety Chain.....75@75&10%
Gal. Pump Chain.....lb. 4@4½¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Covert Sad. Works:
Breast, Hold Back, Rein.....70%
Oneida Community:
Am. Dog Leads and Kennel Chains, 40@40&5%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—
Oneida Community:
Copper Chain.....60&5%
Steel Chain.....60%
Pullman:
Bronze Chain.....60%
Steel Chain.....60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)
Carpenters' Blue.....gro. 38@40¢
Carpenters' Red.....gro. 35@35¢
Carpenters' White....gro. 28@30¢
See also Crayons.

Checks, Door—
Bardsley's.....45%
Eclipse.....60&10%
Pullman, per gro.....$54.00
Russwin.....40%

Chests, Tool—
American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....55%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—
Socket Framing and Firmer
Standard List...75&10@75&10&5%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
L. & I. J. White.....30@30&5%
L. & I. J. White, Tanged.....25&5%

Tanged—
Tanged Firmers.....33 1-3@40%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%

Cold—
lb.
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary...9@10¢

Chucks—
Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat., each $8.00.....35&2%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks....40&10%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model.....25%
Drill Chucks, Standard.....40&10
Drill Chuck, Skinner Pat.....25%
Drill Chucks, Positive Drive.....33⅓%
Planer Chucks.....30%
Face Plate Jaws.....40&10%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17.....40%
Combination, No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..35%
Independent Iron, Nos. 18 and 318.40%
Independent Steel, No. 61.....30%
Union Czar Drill, Nos. 000, 101, 103.....35%
Universal 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 33, 48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and 72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—
Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P., S. & W. Co.....40&10@50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—
Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....40%

Sidewalk—
Star Socket, All Steel..₱ doz. $4.05 net
Star Shank, All Steel..₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—
Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....30%
L. & I. J. White.....30%

Clippers, Horse and Sheep—
Chicago Flexible Shaft Company:
'98 Chicago Horse, each....$8.75
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
20%

Clips, Axle—
Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—
Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....75@75&2½%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—
Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—
Metal Stamping Co.....40%

Mane and Tail—
Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.
Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....60%
Lodi Dividers.....75%

Conductor Pipe,—
L. C. L. to Dealers:

Territory:	*Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper.*
Eastern:			
70&10 %	*60&7½%*		*50%*
Central:			
70&2½%	*60 %*	*40&10&5%*	
Western and S. W.:			
65&10 %	*50&10&2½%*		*47½%*
So. Western			
62½&7½% 50&5%		*40&10%*	
Copper.		*1¼&16 oz.*	
Eastern.....50&10%			
Central.....50&7½%			
Southern.....50&5%			
So. Western.....50&2½%			

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4		6	8
Iceland, ea.	$1.80	$2.10	$2.40		$3.00
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled.....25%
Agate Lined.....25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—
Soldering Coppers, 3 lbs. to pair and heavier, 23@24½¢; lighter than 3 lbs. to pair.....25@26¢

Cord—Sash—
Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 2½¢; No. 7, 2½@2¢; No. 6, 2½@2¢.
Cable Laid Italian.....lb., A, 18¢; B, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted. 17@19¢
Patent Russia.....lb...@1½¢
Cable Laid Russia.....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted..lb. 12@13¢
Anniston Cordage Co.: ₱ lb. solid Braided, Nos. 8 to 12, $1.24; No. 7, $0.24½; No. 6, $0.25½; ₱ doz., 50 ft.; Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ₱ lb, 25½¢; No. 7, 25¢; Nos. 8 to 12, 24½¢
Eddystone Braided, Nos. 8, 9 and 10, 25¢; 7, 25½¢; 6, 26⅞¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....₱ lb 40 ¢
Braided, Italian Hamp.....₱ lb 40 ¢
Braided, Linen.....₱ lb 55 ¢
Braided, White Cotton or Spot.....₱ lb 35 ¢
Massachusetts, White.....₱ lb 30 ¢
Massachusetts, Drab.....₱ lb 35 ¢
Phoenix, White, Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Silver Lake:
A, Drab.....45 ¢
A, White.....40 ¢
B, Drab.....40 ¢
B, White.....35 ¢
Italian Hemp.....40 ¢
Linen.....57½¢
See also Chain and Ribbon.

Wire, Picture—
List Oct., '00.....85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10%

Cradles—
Grain.....40&12½%

Crayons—
White Round Crayons, gr. 6@6½¢
Cases, 100 gro., $5.00 at factory.
D. M. Steward Mfg. Co.: Genuine. Per gro. Round Pencil, $2.25; Square Pencil, $1.75; Flat Crayon, $2.50; Metal Workers' Crayon, $3.00; Rolling Mill Crayon, $3.00. Case lots, 20%
Compo. Per gro. Round Pencil, $1.50; Square Pencil, $1.50; Flat Crayon, $1.50; Metal Workers' Crayon, $2.50; Rolling Mill Crayon, $2.50; Railroad Crayon, $4.00; Compo. Crayon, $4.00. Case lots, 50&20%
Zelnicker's Lumber:
Red, Blue, Green.....₱ gro. $6.50
Black.....₱ gro. $4.00
See also Chalk.

Crooks, Shepherds'—
Fort Madison, Heavy.....₱ doz. $7.00
Fort Madison, Light.....₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—
Victor Garden.....50%

Cutlery, Table—
International Silver Company:
No. 12 M'd'm Knives, 1847..₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters—Glass—
H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—
American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60
Enterprise					25&25&7½%	
Nos.	5	10	12	22	32	
Each	$2	$3	$2.75	$4.50	$6	

Dixon's.....₱ doz. 40@50%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00
Ideal				40&10@50%
Little Giant				₱ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ₱ doz. $24.00.. 40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....₱ doz. 40@50%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—
Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₱ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..₱ gr. $18@$20
Slaw Cutters, 2 Knife..₱ gr. $22@$36

Tobacco—
All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25&30%
National, ₱ doz., No. 1, $21; No. 2, $18.....40%
Sargent's, ₱ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

Washer—
Appleton's, ₱ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—
Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers.....₱ doz. $6.25
Iwan's Perfection Post Hole Digger..₱ doz. $8.25
Iwan's Split Handle Post Hole Diggers.....₱ doz. $7.25
Kohler's Universal.....₱ doz. $14.00
Kohler's Little Giant.....₱ doz. $12.00
Kohler's Hercules.....₱ doz. $10.00
Kohler's Invincible.....₱ doz. $9.00
Kohler's Rival.....₱ doz. $8.00
Kohler's Pioneer.....₱ doz. $7.00
Never-Break Post Hole Diggers, ₱ doz., $24.00.....60%
Samson, ₱ doz. $34.00.....25%

Dividers—See *Compasses.*

Drawers, Money—
Tucker's Pat. Alarm Till No. 1, ₱ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—
Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—
Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—
Bit Stock.....60&10&10@70%
Taper and Straight Shank.... 60&10@60&10&5%

Drivers, Screw—
Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₱ gr.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....50&10%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50, 53 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles.....65%
No. 86.....75%
Victor.....55%
Defiance.....70%
Swan's:
Nos. 7565 to 7568.....50%
No. 7540.....40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper.*
Eastern:			
80&2½%	*70&7½%*		*50%*
Central:			
75&10&7½%	*70%*	*40&10&5%*	
Western and S. W.:			
70&20&7½%	*60&15&2½%*		*47½%*
So. Western:			
70&20%	*65&2½%*		*40&10%*

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—
Factory shipments, all territories:
Galv. Steel and Galv. C. I. Gauge.....60&10%
No. 26.....50%

No. 2½.....25%
No. 22.....10%
Copper.....50%

Elbows, Stove Pipe—
Dover, one piece.....40%
Perfect Elbows (R. M. Co.).....40%

Emery, Turkish—
4 to 46 5½ to 220 Flour.
Kegs.....*lb.* 5 ¢ 5½¢ 3½¢
½ Kegs.....*lb.* 5¼¢ 5¾¢ 3¾¢
¼ Kegs.....*lb.* 5½¢ 6 ¢ 4 ¢
10-lb. cans, 10 in case....6½¢ 7 ¢ 6 ¢
10-lb. cans, less than 10.....*10* ¢ *10* ¢ *8* ¢
Less quantity..*10* ¢ *10* ¢ *8* ¢
NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's.....50&10%
Walling's.....40&10%

Cord and Weight—
Ives.....40%

Faucets—
Cork Lined.....50@50&10%
Metallic Key, Leather Lined..*60&10@70%*
Red Cedar.....*40&10@50%*
Petroleum.....*70&10@75%*
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined...50%
John Sommer's Reliable Cork Lined..50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List revised Nov. 1, 1899.
Best Brands.....*70&10@75&10%*
Standard Brands.75&10@75&10&10%
Lower Grade....*75&10&10@80&10%*

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....*33 1-3@40%*

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103.....$3.75
Special, No. 104.....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.....	*$3.25*	*3.75*	*4.25*	*4.75*

P. S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's.....70%
Stowell's Giant Grindstone Hanger..
℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures, Light..

Fodder Squeezers—60&10%
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—
White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.30*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp.....$2.75
Cotton.....3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern.....*80&10%*

Gauges—
Marking, Mortise, &c..50&10@50%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....33⅓%
Marking and Mortise.....60%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush..*25&10@50%*
International Glue Co. (Martin's)..40%

Grease, Axle—
Common Grade....*gro. $4.50@6.00*
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting in boxes, ℔ doz. 1 lb, $1.20; 2 lb, $2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—
Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each.....$6.00 }

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....*60&10@60&10&5%*
Covert Mfg. Co.:
Web.....45%
Jute Rope.....45%
Sisal Rope.....33⅓%
Cotton Rope.....45%
Hemp Rope.....45%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.....70%
Sisal Rope Ties.....60&10%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%
E. T. Rugg & Co.:
Leather Halters.....50%
Web Halters and Webbing.....60%
Jute and Sisal Rope Halters.....60%
Jute and Sisal Horse and Cattle Ties.....60%
Cotton Horse Ties.....60%
Livery Ties, Braided.....60%

Hammers—
Handled Hammers—
Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
Plumb, A. E. Nail.....33⅓&7⅓@33⅓&10&7⅓%
Engineers' and B. S. Hand.....50&7½&5@50&10&7½&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢.....80&10%
Over 5 lb., per lb., 30¢..80&10&10%
Wilkinson's Smiths'...lb. *9½@10¢*

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....45@50%
Fork, Shovel, Spade, &c.:
Long Handles.....*45@50%*
D Handles.....*50@50&5%*

Cross-Cut Saw Handles—
Atkins'.....40%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handles—
Auger, assorted...*gro. $2.50@$3.00*
Brad Awl.....*gro. $1.65@$1.75*
Chisel Handles:
Apple Tanged Firmer, gro. assorted.....*$2.40@$2.65*
Hickory Tanged Firmer, gro. assorted.....*$2.15@$2.40*
Apple Socket Firmer, gro. assorted.....*$1.75@$1.95*
Hickory Socket Firmer, gro. assorted.....*$1.45@$1.60*
Hickory Socket Framing, gro. assorted.....*$1.60@$1.75*
File, assorted.....gro. *$1.30@$1.40*
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...*65@75¢*
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle.....
℔ gro. $0.85@$1.50

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c
Allith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.00
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.....60&5%
Hinged.....net $6.10
Covered.....60&2%
Special.....70&5%
Lawrence Bros.:
Advance.....60&10%
Cleveland.....75%
Clipper, No. 75.....60%
Crown.....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant.....60&5%
Hummer.....70&5%
New York.....60&10%
Peerless.....75%
Sterling.....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Bayon Hangers.....60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track No. 3...$2.00
Ball B'r'g St'l Track No. 10.50&10%
Roller B'r'g St'l Track No. 12.$2.15
Roller B'r'g St'l Track No. 13.$2.30
Roller B'r'g, Nos. 39, 41, 43, 70&10%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&10%
Trolley B. D. No. 17.....$1.25
Trolley F. D. No. 120.....$2.10
Trolley F. D. No. 121.....$2.25
Trolley F. D. No. 150.....$2.35
Safety Underwriters F. D. No. 101.....50%
Tandem No. 44..2½ and 3 60&10%
Palace, Adjustable Track No. 132.....50&10%
Royal, Adjustable Track No. 122.....50&10%
Ives' Wood Track No. 1.....$2.00
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24.....$1.30
Trolley B. D. No. 27.....$1.40
Trolley B. D. No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43; 44, Sizes 1 and 2..70&10%
Anti-friction, No. 42.....60&10%
Anti-friction, No. 44, Sizes 2½ and 3.....60&10%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135.....40%
Safety Door Hanger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas.....60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator.....40%
Express.....50%
Freight Car Door.....60%
Interstate.....60&10%
Lundy Parlor Door.....50&10%
Magic.....60%
Matchless.....60&10%
Nansen.....70&5%
Parlor Door.....50&10%
Railroad.....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 404, 500....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle.....70%
Hylo Hinge.....60%
New Perfection.....60%
Pilot.....60%
Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.00; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $15.00; Garment Hanger Loops, Round Nickeled, per gro.....$15.00
Victor Folding.....℔ gro. $9.60
Western, W. G. Co.....70&10%

Gate—
Myers' Patent Gate Hangers, ℔ doz. net.....$4.50

Joist and Timber—
Lane Bros. Co.....30%

Extra 5&10% often given.

Hasps—
Griffin's Security Hasp.....50%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—
Regular list, first quality....*50%*
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—
Blind and Shutter Hinges—
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair.....	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair.....	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair.....	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges.....20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Sargent's, Nos. 1, 3, 11 and 13..75&10%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55.....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5....75&10&5%
Tip Pat'n, Nos. 1, 3 & 5...75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only.....	*1.40*	*2.05*	*3.80*
Latches only.....	*.70*	*.70*	*.35*

New England:
With Latch.....*doz.* ....*@$2.00*
Without Latch...*doz.* ....*@$1.60*
Reversible Self-Closing:
With Latch.....*doz.* ....*@$1.75*
Without Latch...*doz.* ....*@$1.35*
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets,

Nos.	1	2	3
Hinges with Latches..	$2.00	2.70	5.00
Hinges only.....	1.40	2.05	3.80
Latches only.....	.70	.70	1.35

Pivot Hinges—
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—
Holdback, Cast Iron...*$6.50@$7.00*
Non-Holdback, Cast Iron$6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges.....40%
Bommer Spring Hinges.....40%
No. 999 Wrot, Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....℔ gr. $3.00
Columbia, No. 18.....℔ gr. $25.00
Columbia, Adjustable, No. 7, ℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.00
Oxford, new list.....30%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges.....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....℔ gr. $9.00
Ball Bearing Floor Hinge....50%
Ohio Detachable Screen Door Hinge.....℔ gr. $12.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
The Stover Mfg. Co.:
Ideal, No. 18, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k, ℔ gro. pr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:

Light Strap Hinges...65%
Heavy Strap Hinges..75%
Light T Hinges.....60%
Heavy T Hinges.....55%
Extra H'y T Hinges..70%
Hinge Hasps.....45%
Cor. Heavy Strap....75%
Cor. Ex. Heavy T..70&10%
} *Extra, 10&5%; 10&10%*

Screw Hook and Strap. { *6 to 12 in..lb. 3¾¢* / *1¼ to 20 in..lb. 3½¢* / *22 to 36 in..lb. 3¼¢*

Screw Hook and Eye:

¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb. 8½¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—

	Per doz.			
Inch	*15*	*16*	*17*	*18*
Galv. Open	*$2.50*	*2.75*	*3.00*	*3.25*
Jap. Open	*$1.90*	*2.10*	*2.25*	*2.55*
Galv. Funnel	*$3.00*	*3.30*	*3.60*	*3.90*
Jap. Funnel	*$2.45*	*2.65*	*2.85*	*3.30*

Masons' Etc.—

Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $0.95
Steel Mortar, No. 158.....each $1.25

Hoes— Eye—

Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....33⅓%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding No. 1, $2.00; No. 2, $2.25
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 66⅔%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe..₱ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱doz.$4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Bardsley's.....45%
Empire.....50%
Pullman.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Hones—Razor—

Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List, Nos. 29, 32, 33, 129, 132, 133 and 135.....50&10&10%
Clothes Line, Reading List.....40%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....80&10@..%
Wire C. & H. Hooks:.....
75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King..70&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....75%
Czar.....55%
V Brace.....75%
Czar Harness.....50&10%

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.— See Wrought Goods

Miscellaneous—

Hooks, Bench, see Stops, Bench.
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Guaranteed..ft. 8 @ 9 ¢
4-ply Guaranteed..ft. 10 @11 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—

From ¼ to 10.....lb. 3 @3½¢
B. B. Sad Irons.....lb. 3¼@3½¢
Mrs. Potts', cents per set:

Nos.	*50*	*55*	*60*	*65*
Jap'd Tops	*68*	*65*	*78*	*75*
Tin'd Tops	*71*	*68*	*81*	*78*

New England Pressing.lb. 3¾@4¢

Pinking—

Pinking Irons.....doz. 60¢

Irons, Soldering

See *Coppers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%
Steel.....45%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros. Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Wilkinson Wilcut Brand Knives and Hooks.....60%
Wilmington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....75@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
Watrous.....16⅔%
L. & I. J. White:.....20&5@25%

Hay and Straw—

Serrated Edge, per doz.$5.75@6.00
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Mincing—

Buffalo.....₱ gro. $13.00

Miscellaneous—

Farriers'.....doz. $3.00@3.25
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....gro.$1.25@$1.50
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%

Lanterns—Tubular—

Regular Tubular, No. 0.....
doz.$4.25@4.50
Lift Tubular, No. 0.....
doz.$4.75@5.00
Hinge Tubular, No. 0.....
doz.$4.75@5.00
Other Styles.....40@40&5%

Bull's Eye Police—

No. 1, 2¾-inch.....$2.75@3.00
No. 2, 3-inch.....$3.00@3.25

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—

Roggin's Latches, with screw..
doz. 35@40¢

Door—

Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.90
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45%; Sisal, 33⅓%.

Lifters, Transom—

R. & E.....33⅓%

Lines—

Wire Clothes, Nos. 18 19 20
100 feet.....$2.25 2.00 1.75
75 feet.....$1.75 1.55 1.10

Anniston Waterproof Clothes, 50 ft., ₱ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%

Locks— Cabinet—

Cabinet Locks...33⅓@33⅓&7½%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—

Stowell's.....50%

Padlocks—

Wrought Iron....75&10&5@80&5%
Net prices are general.
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading.....40%

Machines—Boring—

Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Swan's Improved.....40&10%
Angular
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—

Reisinger Invincible Hand Power.... ₱ doz. $18.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—

Chandler's.....12½%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$54.00
Champion Rotary Banner No. 1	$54.00
Standard Champion No. 1	$48.00
Standard Perfection	$26.00
Cinti Square Western	$30.00
Uneeda American, Round	$30.00

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Apple-wood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mashers, Vegetable—

Western W. G. Co., Potato....60&10%

Mats, Door—

Elastic Steel (W. G. Co.), new list.. 50&10%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest.....all sizes, $1.85@2.00
Cheap.....all sizes, $2.00@2.50
Better Grade..all sizes, $2.50@4.50

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel....70&10&10&5%
Style B, Low Wheel.....70&10&5%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M. S. C. K. T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—

Wire Nails and Brads, Miscellaneous.....85&5@85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...10&5%
Champlain	28	26	25	24	25	.....50%
Coleman	15	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5
Putnam	23	21	20	19	18	...33¼%
New Putnam	19	18	17	16	16	..10&10%

Western.....₱ lb 8½¢
Jobbers' Special Brands.....
per lb.9@10¢

Picture—

	1½	*2*	*2½*	*3*	*3½ in.*
Brass H'd	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Mfrs. or U. S. Standard.
Square, Blank or Tapped..$4.90
Hexagon, Blank or Tapped.$5.30
Square, Blank, C. & T.....$5.20
Hexagon, Blank, C. & T...$5.90
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.30
Hexagon, Blank.....$5.20
Square, Tapped.....$5.20
Hexagon, Tapped.....$5.70

Oakum—

Best.....lb. 6¼@6½¢
U. S. Navy.....lb. 5¾@6¢
Navy.....lb. 4½@5¢
Plumbers' Spun Oakum...2½@3¢
In carload lots ⅛¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper.....50&10%
Tin or Steel.....70@70&5%
Zinc.....70@70&5%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Imp'ed, Nos. 11, 12 and 13.....20%
Malleable, Hammers' Old Pattern, Nos. 1, 2 and 3.....50%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*

Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....$1.75@$3.00
National.....50&10%
Stowell's Sprague.....₱ doz. 35@45¢
Vim Tin Shear and Can Opener, ₱ doz., 75c.; per gro., $7.50

Egg—

Nickel Plate.....₱ doz., $2.00
Silver Plate.....₱ doz., $4.00

Packing—

Asbestos Packing, Wick and Rope.....17@22¢

Rubber—

(Fair quality goods.)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96. ₱ lb 80¢.....25@25&5%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—

R. M. Co., with gauges—No. 1, $6.25; No. 2, $6.50 ₱ doz.

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.....65&10%

Fry—

Common Lipped:

	Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.		*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.95*	*2.25*	*2.80*	*3.15*

Roasting and Baking—

Regal, R. M. Co., ₱ doz., Nos. 5, $1.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory ₱ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

	lb.	
Asbestos:		
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	*6c*	*Per roll*
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lbs., per 100 sq. ft.	*8c*	*Per roll*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	*10c*	*Per roll*
Rosin Sized Sheathing, 500 sq. ft. Light weight, 25 lbs. to roll		*$5@70¢*
Medium weight, 30 lbs to roll,		*70@75¢*
Heavy weight, 40 lbs. to roll..		*70@60¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.		
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$48.00		
Red Rope Roofing, 250 sq. ft. per roll.....$1.75		

Tarred Paper—

1 ply (roll 500 sq. ft.). ton....
$32.50@35.50
2 ply, roll 108 sq. ft.....55¢
3 ply, roll 108 sq. ft.....75¢
Slater's Felt (roll 500 sq. ft.).70¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.75

Sand and Emery—

Flint Paper and Cloth.60@60&10%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h.60@60&10%

Parers— Apple—

Advance ..... ℔ doz. $4.00
Baldwin ..... ℔ doz. $4.00
Bonanza Improved..... each $6.50
Daisy ..... ℔ doz. $4.50
Dandy ..... each $7.50
Eureka Improved..... each $20.00
Family Bay State..... ℔ doz. $15.00
Improved Bay State..... ℔ doz. $36.00
Little Star..... ℔ doz. $5.00
New Lightning..... ℔ doz. $7.00
Reading 72..... ℔ doz. $3.25
Reading 78..... ℔ doz. $6.25
Rocking Table..... ℔ doz. $6.20
Turn Table '98..... ℔ doz. $6.00
White Mountain..... ℔ doz. $5.00

Potato—

Saratoga ..... ℔ doz. $7.00
White Mountain..... ℔ doz. $6.00

Picks and Mattocks—

List Feb. 23, 1899.....75%
Cronk's Handled Garden Mattock, ℔ doz., $6.40.....33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass .....60@60&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in..50&10@50&10&5%
Extra Heavy, 2-6 in.....65&10%
Fittings .....70&10@70&10&5%

Pipe, Merchant—

	Consumers, Carloads.			
	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
⅛ & ¼ *in.*	71%	55%	68%	52 %
⅜ *in.*	73%	59%	70%	56 %
½ *in.*	75%	63%	72%	60 %
¾ *to 6 in.*	79%	67%	76½%	66¼%
7 *to 12 in.*	74%	59%	71½%	56 %

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 2 to 24 in.:
New England.....68%
New York and New Jersey.71%
*Maryland, Delaware, E. Pa.*75%
West. Pa. and West Va....77½
Virginia 76%
Ohio, Michigan and Ky....77½
Indiana 77%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....40&10%
Bench, Second qual.....50&10%
Molding .....33⅓&10%
Bailey's (Stanley R. & L. Co.).....40%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Toy and German.....40@40&10%
Chaplin's 60%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality....50@50&10%
Molding .....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Unicn 60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....40%
Chapin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....35%
Ohio Tool Co.'s Iron Planes.....60%
Sargent's .....60&10%
Union 60%

Plane Irons—

Wood Bench Plane Irons.....
.....25&10@30%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co.....35%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

Plates—

Felloe .....lb. 4@4¼¢
Self-Sealing Pie Plates (R. M. Co.). ℔ doz. $2.00.....50%

Pliers and Nippers—

Button Pliers....75&10@75, 10, 5%
Gas Burner, per doz.. 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $3.00 $3.75
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's 60%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.'.....40&10@40&10&10%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....40%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard 33⅓%
Elm City.....33⅓%
Lodi 50%
Paragon 50%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor.40@40&10&10%
Pocket Levels.....30@30&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....10%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable .....40&7½%
Stanley R. & L. Co.....45%
Stanley's Duplex.....30%
Woods' Extension.....50%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers,.....lb. 10¢
½-lb. papers.....lb. 9@10½¢
¼-lb. papers.....lb. 9¾@11¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72....40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans,. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each. $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside .....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese .....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....*gro. $9.00*
1 qt., Round.....*gro. $10.00*
1½ qt., Square.....*gro. $11.00*
2 qt., Square.....*gro. $13.00*

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned 35%

Powder—

In Canisters:
Duck, 1 lb.....*each 45¢*
Fine Sporting, 1 lb....*each 75¢*
Rifle, ½-lb.....*each 15¢*
Rifle, 1-lb.....*each 25¢*
In Kegs:
12½-lb. kegs.....*$3.50*
25-lb. kegs.....*$4.50*
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller.....$21.00

Pullers, Nail—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00.....33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots..... ℔ doz. $6.00
Diamond B, No. 3, case lots..... ℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15.....33⅓%
Staple Pullers.....60%
Parrot Tack and Stub Puller, ℔ doz., 75c.; ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.15	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.00	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.80
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....*16@19¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in..*16@19¢*
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal .....70&10%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern .....*60@60&10%*
Pitcher Spout.....*80@80&10%*
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list).....50%
Barnes' Pitcher Spout.....75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.75
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list) .....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$6.00
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good.....
.....*doz. 50@75¢*
Spring, single tube, good quality.....*$1.75@2.00*
Revolving (4 tubes).....
.....*doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's Nos. 1AA, 1A, 1B, 16, $15.00 .....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Bernard 33⅓%
Lodi 50%
Paragon 50%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co...40%
Tinners' Solid, P., S. & W. Co.. ℔ doz., $1.44.....60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.....
.....2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....*30%*
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2½¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $4.10.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard .....℔ ft. 4 ¢
Myers' Stayon Track.....60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U. S. Standard 60%
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain.....25%
Wrought Bracket, 1 3-16 in....℔ ft. 3¢
Wrought Bracket, 1⅛ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $2.75

Rakes—

NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn...$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00..75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.....80%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60.....net.
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $3.00
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00
Weldless Steel Garden.....75&5%

Rasps, Horse—

Disston's 75%
Heller Bros.'.....70&5@70&10&5%
McCaffrey's American St'd...60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

Boras—I C.....60%
Fox Razors, No. 42..℔ doz. $20.00
Fox Razors, No. 44..℔ doz. $20.00
Fox Razors, No. 82, Platina... ℔ doz. $25.00
} Dis 40%
Red Devil.....50%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

Safety Razors—

Kampfe Bros.:
Star Safety.....25%
Star Interchangeable.....25%
Star Safety Corn.....25%
Silberstein 40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed .....70&10%

Revolvers—

Single Action.....*95¢@$1.00*
Double Action, except 44 cal.$1.85
Double Action, 44 caliber....*$2.00*
Automatic *$3.45*
Hammerless *$4.00*

Riddles, Hardware Grade

16 in.....*per doz.$2.50@$2.75*
17 in.....*per doz.$2.75@$3.00*
18 in.....*per doz.$3.00@$3.25*

Rings and Ringers—

Bull Rings—

	2	2½	*3 inch.*
Steel	$0.70	0.75	*0.80 doz.*
Copper	$1.00	1.15	*1.40 doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes.$4.00@4.50
Hill's Ringers, Gray Iron.....
.....*doz. 50@55¢*
Hill's Ringers, Malleable Iron..
.....*doz. 70@75¢*
Blair's Rings...*per gro.$4.75@5.25*
Blair's Ringers.per doz.$0.60@ .65
Brown's Rings..*per gro.$5.00@5.50*
Brown's Ringers.per doz.$0.60@ .65

Rivets and Burrs—

Copper .....*45@45&5%*
Iron or Steel.....*75@75&5%*

Bifurcated and Tubular—

Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay No. 65, $0.90; No. 50 .....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56.....$0.84
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger: Pure .....*lb., 12½¢*
Sisal, 7-16 in. diam. and larger: Pure .....*lb., 10¢*
Sisal, 7-16 in. diam. and larger: No. 2 quality.....*lb., 8¢*
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed .....*lb., 8¢*
Pure .....*lb. 10¢*
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed .....*lb., 8¢*
Pure .....*lb. 10¢*
Cotton Rope: Best, ¼-in. and larger. 16½@18¢
Medium, ¼-in. and larger. 15½@16½¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread No. 1, ¼-in. & up. lb. 6¼¢
Thread No. 2, ¼-in. & up, lb.5¾¢
Old Colony Manila Transmission Rope .....℔ lb 17½¢

Wire Rope—

Galvanized .....*37½&2½%*
Plain .....*45&2½%*

Ropes, Hammock—

Covert Mfg. Co.:

Jute 45%
Sisal 33⅓%
Covert Saddlery Works..... 60&5%

Rulers, Desk—
Stimpson & Son
Boxwood and Maple..... 30&10%

Rules
Boxwood ..... 60&10&10%
Ivory ..... 35&10@35&10&10&5%
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Flexifold ..... 27½&10&10&2½%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10%
Stationers' Goods ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band ..... 50&10@60
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c. 40%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth..50%
Band, 2 to 14 in. wide 60%
Band, ¼ to 1⅜ 50%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, 108, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 40%
Compass, Key Hole, &c. ..25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws....40&10@50%
Butcher Saws Blades..... 35@40%
Wheeler, Madden & Clemsen Mfg. Co.'s Cross Cut Saws..... 50%

Hack Saws—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best...35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades..... 40%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades..... 35%
Diamond Hack Saw Frames..... 50%
Star Hack Saws and Blades..... 15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames...30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades..... 25%
Victor Hack Saw Frames..... 40%

Scroll—
Barnes' No. 7, $15..... 25%
Barnes' Scroll Saw Blades..... 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20..... 20%
Lester, complete, $10.00..... 15&10%
Rogers, complete, $4.00..... 15&10%

Scalers, Fish—
Covert's Saddlery Works..... 60&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... doz. $5.50
Two Platforms, ½ oz. to 8 lbs. ..... doz. $18.00
Union Platform, Plain $1.70@1.90
Union Platform, Stpd. $1.85@2.15
Chatillon's:
Eureka 35%
Favorite 40%
Crocers' Trip Scales..... 50%
Chicago Scale Co.:
The "Little Detective"....25 lbs 50%
Union or Family No. 2..... 60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
"The Standard" Portables..... 50%
"The Standard" R. R. and Wagon..50%

Scrapers—
Box, 1 Handle....doz. $2.00@2.25
Box, 2 Handle....doz. $2.60@2.85
Ship....Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00..... 45%
Chapin-Stephens Co., Box, 30@30&10&10%

Screens, Window and Frames—
Maine Screen Frames..... 40&10&5%
See also *Doors.*

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, W'd, Beech. doz. 30@30&5%
Hand, Wood..... 30@30&5%
R. Bliss Mfg. Co., Hand....30@30&10%
Chapin-Stephens Co., Hand..30@30&10%
Ohio Tool Co., Bench and Hand..30%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 ..... 75&15%
Coach, Gimlet Point, list Oct. 1, '99 ..... 75&10%
Hand Rail, list Jan. 1, '81.... 70&10@75%

Jack Screws—
Standard List..... 80@80&5%
Millers Falls..... 50&10&10%
Millers Falls, Roller..... 50&10%
P., S. & W..... 50%
Sargent ..... 70&10%
Swett Iron Works..... 75&10@80&5%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron.... 50@50&10%
Flat or Round Head, Brass.... 50@50&10%

Set and Cap—
Set (Iron)..... 80%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap..... 75%
Hex. Hd. Cap..... 75%
Rd. Hd. Cap..... 60&10%
Fillister Hd. Cap..... 60&10&10%

Wood—
List July 23, 1903.
Flat Head, Iron....87½&10@..%
Round Head, Iron....85 &10@..%
Flat Head, Brass....85 &10@..%
Round Head, Brass..80 &10@..%
Flat Head, Bronze...77½&10@..%
Round Head, Bronze.75 &10@..%
Drive Screws..... 87½&10%

Scroll Saws—
See *Saws, Scroll.*

Scythes— *Per doz.*
Grass, No. 1, Plain Finish...$6.25
Clipper, Bronzed Webb....$6.50
No. 3 Clipper, Pol'd Webb..$6.75
No. 6 Clipper & Solid Steel. $7.00
Bush, Weed & Bramble, No. 2. $6.50
Grain, No. 1..... $8.25
Bronzed Webb, No. 1..... $8.50
Nos. 3 & 4 Clipper, Grain..$8.75
Solid Steel No. 6..... $9.25

Seeders, Raisin—
Enterprise ..... 25@30%

Sets— Awl and Tool—
Aiken's Sets, Awl and Tools:
No. 20, ℔ doz., $10.00..... 60&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel..... ℔ doz sets $9.00

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros..... 27½%
Cannon's Diamond Point, ℔ gro. $12.40%
Mayhew's ..... ℔ gro. $9.00
Snell's Cor'gated, Cup Pt....℔ gro. $7.20
Snell's Knurled, Cup Pt....℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt.℔ gro. $7.50

Rivet—
Regular list..... 75@75&10%

Saw—
Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut..... 30%
Plate 20%
Disston's Star and Monarch..... 25%
Morrill's No. 1, $15.00..... 50%
Nos. 3 and 4, Cross Cut, $20.00...50%
No. 5, Mill, $30.00..... 50%
Nos. 10, 11, 95, $15.60..... 50%
No. 1 Old Style, $10.00..... 50%
Special, $16.25..... 50%
Giant Royal Cross Cut.....℔ doz. $8.00
Royal, Hand..... ℔ doz. $4.50
Taintor Positive..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30 .....
℔ doz., net, $24.00
Smith & Hemenway Co.'s..... 60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co..... 70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz..... $1.50
Mounted Kitchen Sand Stone, ℔ doz..... $1.50
Natural Grit Carving Knife Hones, ℔ doz..... $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz..... $1.50
Quick Edge Pocket Knife Hones, ℔ doz..... $2.50

Skate—
Smith & Hemenway Co..... 20%

Shaves, Spoke—
Iron ..... doz. $1.10@1.25
Wood ..... doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.)..... 45%
Razor Edge (Stanley R. & L. Co.)..35%
Chapin-Stephens Co..... 30@30&10&10%
Goodell's ℔ doz. $9.00..... 15&10%
Wood's F1 and F2..... 50%

Shears—

	7	8	9 in.	
Cast Iron..				
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good ...	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap ..	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fail quality, Nickel..75@75&10%
Tailors' Shears..... 40@40&10%
Acme Cast Shears..... 40@40&5%
Heinisch's Tailor's Shears..... 10%
Wilkinson's Sheep, 1900 list, 30&10&5%; Grass, 50&10%; Horse or Mule, 50&10%

Tinners' Snips—
Steel Blades..... 20&5@20&10%
Steel Laid Blades..... 40&10@50%
Forged Handles, Steel Blades, Berlin, 50@50&5%
Heinisch's Snips..... 10%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in..... 50%
Niagara Snips..... 40%
P., S. & W. Forged Handles..... 20%

Pruning Shears—
Cronk's Hand Shears..... 33⅓%
Cronk's Wood Handle Shears..... 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades....50&10%
P., S. & W. Co..... 33⅓%
Wilkinson's Hedge, Wilcut Brand, 60&10%
Wilkinson's Lawn and Border, Wilcut Brand..... 60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction..... 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 40%
R. & E. list..... 33⅓%
Wrightsville Hatfield Pattern..... 80%

Sliding Shutter—
Reading list..... 40%
R. & E. list..... 33⅓%
Sargent's list..... 10&10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, Club, Rival, 10 and 12 gauge ..... 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge 20%
Climax, Union, League, New Rival, 10 and 12 gauge..... 25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge..... 20%
Expert, Metal Lined and Pigeon, 10 12, 16 and 20 gauge..... 33⅓
Robin Hood, Low Brass..... 20&5%
Robin Hood, High Brass..... 30&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade..... 40&5%
Loaded with Smokeless Powder, high grade..... 40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass..... 50%
Comets, High Brass..... 50&10&5%

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg $4.00
Steel ..... per keg $3.75
Burden's, all sizes..... ℔ keg $3.90

Shot—
Drop, up to B, 25-lb. bag....$1.80
Drop, B and larger..... per 25-lb. bag, $2.05
Buck, 25-lb. bag..... $2.05
Chilled, 25-lb. bag..... $2.05

Shovels and Spades—
Association List, Nov. 15, 1902. 40%

Snow Shovels—
Long Handle..... $2.75@$3.00
Wood and Mall, D. Handle, $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation..... gro. $9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50

Buffalo Metall'c Blued, R. M. Co., ℔ gr.		
14&16	16&18	18&20
$13.20	$13.50	$14.40

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00..... 20%

Sieves, Seamless Metallic

	—Per dozen.—			
Mesh 14	*16*	*18*	*20*	
Iron Wire....$1.05	*1.05*	*1.10*	*1.20*	
Tinned Wire..$1.15	*1.15*	*1.20*	*1.30*	

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in....60&5%
20 x 40 to 24 x 50 in..... 55%
24 x 60 to 24 x 120 in..... 35%
Barnes' low list:
Up to and including 20 x 36 in....60%
20 x 40 to 24 x 50 in..... 55%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron..... 80@80&10%
Steel ..... 40@40&10%

Slates, School—
Factory Shipments.
"D" Slates..... 50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless. 60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby ..... 30&2%
High Grade..... 45%
Jockey 35%
Trojan 30%
Yankee ..... 30&2%
Yankee Roller..... 30&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Harness Snaps, 1 inch..... 60&5%
Swivel Snaps..... 60%
Swivels 50%
Sargent's Patent Guarded....66⅔&10%

Snaths—
Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand..... 50&10%
Anchor, Rogers Brand..... 60%
Wm. Rogers & Son..... 60&10%

Miscellaneous—
German Silver..... 60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver..... 50%

Tinned Iron—
Teas ..... per gro. 45@50¢
Tables..... per gro. $0.50@$1.00

Springs— Door—
Chicago (Coil)..... 40&10%
Gem (Coil)..... 20%
Pullman (Coil)..... 25%
Reliance (Coil)..... 40&10%
Star (Coil)..... 30%
Torrey's Rod, 39 in.....℔ doz. $1.10
Victor (Coil)..... 50&10&10%

Carriage, Wagon, &c.—

1¼ in. and Wider:	*Per lb*
Black ..... 4@4¼¢	
Half Bright..... 4@4¼¢	
Bright ..... 4½@4¾¢	

Painted Seat Springs:
1½ x 2 x 26..... per pr. 42¢
1½ x 3 x 28..... per pr. 70¢

Sprinklers, Lawn—
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24..... 30%
Pleuger & Henger Mfg. Co.:
Cactus 70%
Japanese 75%
Nationals 65%

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron.. } *75&10@80%*
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Sq. and T-Bevels....70%
Winterbottom's Try and Miter, No. 1, 40%; No. 2..... 50%

Squeezers, Lemon
Wood, Common, gro.. No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade..... doz. $1.25
Tinned Iron..... doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind..... lb. 6@6½¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples..... per lb. 3¼@3½¢
Grand Crossing Tack Co.'s list..80&10%

Steels, Butchers'—
Dick's 30%
Foster Bros.' 30%
C. & A. Hoffmann's..... 40%

Steelyards — ....30@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates..... 25%
Green River..... 25%
Lightning Screw Plate..... 25%
Little Giant..... 25%
Reece's New Screw Plates..... 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit..60%
Gem Corundum Axe, Single or Double Grit..... 60%
Gem Corundum Slips..... 60%
Gem Corundum Razor Hones....50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.90
Arkansas St. No. 1, 5½ to 8 in. 3.50
Arkansas Slips No. 1..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips..... 30¢
Rosy Red Slips..... 30¢
Washita Slips, Extra..... 30¢
Washita Slips, No. 1..... 70¢
Washita Slips, No. 2..... 40¢
India Oil Stones (entire list)..... 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit..... 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit..... 33⅓%

Quickcut Emery Rubbing Bricks.33⅓%
Hindostan No. 1, R'g'lar, ₱ lb 8¢
Hindostan No. 1, Small..₱ lb 10¢
Axe Stones (all kinds)
Turkey Oil Stones, Extra, 5 to 8 in. ₱ lb 80¢ } 33⅓%
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.40¢
Sand Stone.6¢

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ₱ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots. ₱ gro. $9.00
One gross or more. ₱ gro. $7.20
Lots of 10 gross or more. ₱ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S. ₱ gro. $12.00
Lamoille S. S. ₱ gro. $11.00
White Mountain S. S. ₱ gro. $9.00
Green Mountain S. S. ₱ gro. $6.00
Extra Indian Pond S. S. ₱ gro. $7.50
No. 1 Indian Pond S. S. ₱ gro. $7.00
No. 2 Indian Pond S. S. ₱ gro. $4.50
Leader Red End S. S. ₱ gro. $4.50
Quick Cut Emery. ₱ gro. $10.00
Pure Corundum. ₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8
Emery Scythe Rifles, 3 Coat. $10
Emery Scythe Rifles, 4 Coat. $12
Balance of 1904 list 33⅓%.

Stoppers, Bottle—

Victor Bottle Stoppers. ₱ gro. $9.00

Stops—Bench—

Millers Falls.15&10%
Morrill's, ₱ doz., No. 1, $10.00.50%
Morrill's, No. 2, $12.50.50%

Door—

Chapin-Stephens Co.60@60&10%

Plane—

Chapin-Stephens Co.20%

Straps—Box—

Cary's Universal, case lots.25&20%

Hame—

Covert's Saddlery Works.60&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket doz. $1.60
Bullard, ₱ doz.$4.00
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00.20%

Strops, Razor—

Star Diagonal Strop.25%

Stuffers, Sausage—

Enterprise Mfg. Co.25@25&7½%
National Specialty Co., list Jan. 1, 1902.30&3%

Sweepers, Carpet—

National Sweeper Co.: ₱ doz.
Louis XV, Roller Bearing, Gold Plated $120.00
Hepplewhite, Roller Bearing, Silver Plated.$72.00
Sheraton, Roller Bearing, N'kel.$60.00
Ye Mission, Roller Bearing, Oxidized Coppered.$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled.$36.00
National Queen, Roller Bearing, Fancy Veneers.$27.00
Loyal, Roller Bearing, Veneers, Nickeled.$25.00
Triple Medal, Roller Bearing, Nickeled.$24.00
Marion, Roller Bearing, N'kel.$24.00
Marion Queen, Roller Bearing, Nickeled.$24.00
Monarch, Roller Bearing, N'kel.$22.00
Monarch, Roller Bearing, Jap.$20.00
Perpetual, Regular B'r'gs, N'kel.$20.00
Perpetual, Regular B'r'gs, Jap.$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled.$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned.$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled.$54.00
Mammoth (30 in. case), Roller Bearing, Nickeled.$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Model E, Sanitaire. ₱ doz $25.00
Model A, Sterling. ₱ doz. $25.00
Model B, Sterling, Nickeled. ₱ doz. $23.00
Model B, Sterling, Japanned. ₱ doz. $21.00
Model C, Sterling. ₱ doz. $21.50
Model D, Sterling. ₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks. 90&5&7½&10%
American Cut Tacks. 90&5&7½&10%
Swedes Cut Tacks. 90&5&7½&10%
Swedes Upholsterers'. 90&50&10%
Gimp Tacks. 90&50&10%
Lace Tacks. 90&50&10%
Trimmers' Tacks. 90&50&10%
Looking Glass Tacks. 65&5%
Bill Posters' and Railroad Tacks, 90&50&10%
Hungarian Nails. 85%
Finishing Nails. 70&10%
Trunk and Clout Nails. 80&10%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks. 90&5 or 6 tens

See also Nails, Wire.

Tanks, Oil—

	Each.
Emerald, R. M. Co.	30-gal. $3.40
Emerald, R. M. Co.	60-gal. $4.25
Queen City, R. M. Co.	30-gal. $3.65
Queen City, R. M. Co.	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin. 50@—%
Patent Leather. 25@30&5%
Steel 33 1-3&5%
Chesterman's 25@25&5%
Eddy Asses' Skin.40&10@50%
Eddy Patent Leather.25@30&5%
Eddy Steel.40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin.40&10@50%
Favorite, Duck and Leather. 25&5@25&10%
Metallic and Steel, lower list. 35@35&5%
Pocket .35@35&5%
Lufkin's:
Asses' Skin.40&10@50%
Metallic .30@30&5%
Patent Bend, Leather.25&5@25&10%
Pocket .40@40&5%
Steel .33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 8" and larger. per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case. 80¢&10@80¢&10&5%

Ties, Bale—Steel Wire—

Single Loop. 80&2½%
Monitor, Cross Head, &c. 70%

Brick Ties—

Niagara Brick Ties.25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.20@20&5%

Hay—

Myers' Hay Tools.50%
Stowell's Hay Carriers.50%
Stowell's Hay Forks.50%
Stowell's Fork Pulleys.50%

Miniature—

Smith & Hemenway Co.'s.25%

Saw—

Atkins' Cross Cut Saw Tools.40%
Simonds' Improved.33⅓%
Simonds' Crescent.25%

Ship—

L. & I. J. White.25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida. 75@75&5%
Newhouse .45@45&5%
Hawley & Norton.65%
Victor .70&10%
Oneida Community Jump.50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ₱ doz. $13.25
No. 3, Rat, ₱ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ₱ doz. $5.25; case of 72 ₱ gro. $4.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E I.50%

Trowels—

Disston Brick and Pointing.30%
Disston Plastering.25%
Disston "Standard Brand" and Garden Trowels.35%
Kohler's Steel Garden Trowels, 5 in. ₱ gro. $4.80
Kohler's Steel Garden Trowels, 6 in. ₱ gro. $6.00
Never-Break Steel Garden Trowels.. ₱ gro. $6.00
Rose Brick and Plastering.25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.50&10%
Western Pattern.60&10%
Handy Trucks. ₱ doz. $16.00
Grocery ₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern ₱ doz. $18.50
McKinney Trucks. each $10.00
Model Stove Trucks. ₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.,	$4.25	4.75	5.25

Galvanized Wash Tubs (R. M. Co.):

No.	1	2	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20 8.10

Twine, Miscellaneous—

Flax Twine:	BC.	B.
No. 9, ¼ and ½-lb. Balls.	22@24¢	
No. 12, ¼ and ½-lb. Balls.	18@20¢	
No. 18, ¼ and ½-lb. Balls.	16@18¢	
No. 24, ¼ and ½-lb. Balls.	16@18¢	
No. 36, ¼ and ½-lb. Balls.	15@17¢	
Chalk Line, Cotton ½-lb. Balls	25@30¢	
Cotton Mops, 6, 9, 12 and 15 lb. to doz.	10@18¢	
Cotton Wrapping, 5 Balls to lb., acording to quality.	11½@20¢	
American 2-Ply Hemp, ¼ and ½-lb. Balls.	13@14¢	
American 3-Ply Hemp, 1-lb. Balls	13@14¢	
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).	31½¢	
India 3-Ply Hemp, 1-lb. Balls.	31½¢	
India 3-Ply Hemp, 1½-lb. Balls.	7@8¢	
2, 3, 4 and 5-Ply Jute, ½-lb. Balls	9@10¢	
Mason Line, Linen, ½-lb. Bls.	46¢	
No. 24 Mattress, ¼ and ½-lb. Balls	37¢	
Wool, 3 to 6 ply.	B 6¢; A 6½¢	

Vises—

Solid Box. 60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.40%
Standard .40%
Amateur .25%
Columbian Hdw. Co.40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 5A, $7.00; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting.25@25&5%
Tiger Machinists'.40%
Fisher & Norris Double Screw..15&10%
Hollands':
Machinists' .40@40&5%
Keystone .65&5@70%
Lewis Tool Co.:
Adjustable Jaw.30%
Monarch .50%
Solid Jaw.50%
Massey Vise Co.:
Clincher .40%
Perfect .20%
Lightning Grip.20%
Merrill's .20%
Millers Falls.60&10%
Parker's:
Victor .20@25%
Regulars .20@25%
Vulcan's .40@45%
Combination Pipe.55@60%
Prentiss .20@25%
Sargent's .40%
Snediker's X. L.33⅓%
Stephens' .33⅓%
Williamson Mfg Co. Double Swivel.. 40&5%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz. $30.25%
Perfection Saw Clamps, ₱ doz.$4.50
Reading .60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip.15%
Perfect .15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise .60&10%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.40%
Parker's Combination Pipe:
87 Series.60%
187 Series.60&5%
No. 870.40%
Williamson Mfg. Co. Double Swivel Combination Pipe.40&5%

Wads—*Price per M.*

	Dis. 15%
B. E., 11 up	60¢
B. E., 9 and 10	70¢
B. E., 8	80¢
B. E., 7	80¢
P. E., 11 up	$1.00
P. E., 9 and 10	1.25
P. E., 8	1.50
P. E., 7	1.50
Ely's B. E., 11 and larger	$1.70@1.75
Ely's P. E., 12 to 20	$3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled .55%
Ground .60%
Plain or Unground .65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles .70%
Covered Wares
Tinned and Turned .40%
Enameled .50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.60%
Iron Clad Ware.70&10%
Lava, Enameled.40&10%
Never Break Enameled.50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.60%
Porcelained .50&50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles.60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles.60%

Warmers, Foot—

Pike Mfg. Co., Soapstone.40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame.$3.25
Red Star, family size, stationary protector .$3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.$2.90
Cable Cross, family size, stationary protector.$3.15
Single Zinc Surface:
Naiad, family size, open back, perforated .$2.65
Saginaw Globe, protector, family size, ventilated back.$2.50
Brass Surface:
Brass King, Single Surface, open back .$3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface .$3.25
Glass Surface:
Glass King, Single Surface, open back .$3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back.$3.25

Washers—Leather, Axle—

Solid .50&10@80&10&10%
Patent .90@90&5%
Coil: ¾ 1 1¼ 1½ Inch.
10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt.	5-16	⅜	½	⅝	¾
Washers	$5.70	4.80	3.50	3.30	10

The above prices are based on 5.70¢ off list.

In lots less than one keg, ½¢ per lb.; 5-lb. boxes ¼¢ to list.

Cast Washers—

Over ½ inch, barrel lots. per lb. 1¾¢

Weather Strip—Flexible Felt—

Lined, per 100 ft., $2; $3; $4.40%
Moore's Unlined, per 100 ft., $2; $4.5%

Wedges—

Oil Finish. lb. 2.70¢

Weights—Hitching—

Covert Mfg. Co.
Covert's Saddlery Works.

Sash—

Per ton, f.o.b. factory:
Eastern District. $27.50@$28.00
Southern Territory. $20.00@$22.00
Western and Central Districts. $23.00@$25.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9. 80&2½%
10 to 18. 80&7½%
19 to 26. 80&7½%
27 to 36. 80&2½%
Galvanized:
6 to 9.
10 to 14.
15 to 16. 72½
19 to 26.
27 to 36.
Coppered:
6 to 9. 75&
10 to 14. 75&7½%
15 to 18. 72½&10&2½%
19 to 26. 75&10&
27 to 36. 7
Tinned:
6 to 14. 75&10&2½%
15 to 18. 75&7½%
Annealed, Steel and Tinned, on Spools. 70&10&10@70&10&10&10%
Brass and Copper on Spools. 60&5@60&10&5
Brass, list Feb. 26, '96. 15
Copper, list Feb. 26, '96. 25
Cast Steel Wire. 50
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, '03. 90&25@90&30
Brass Cup Hooks and Brass Screw Hooks. 85&10

Wire Cloth and Netting

Galvanized Wire Netting. 80&5@80&10
Painted Screen Cloth, 100 ft., $1.00@1.
Standard Galv. Hardware Grade Nos. 2, 2½ & 3 Mesh, sq. ft. 3
Nos. 4 and 5 Mesh, sq. ft. 3¼
No. 6 Mesh, sq. ft. 3½
No. 8 Mesh, sq. ft. 4

Wire, Barb—See *Trade Report.*

Wrenches—

Agricultural .75&10&5@80%
Alligator or Crocodile. 70&10@75%
Baxter Pattern S Wrenches. 70&5@70&10%
Drop Forged S. 45@45&5%
Acme .60&10%
Alligator Pattern.70%
Bull Dog.70%
Bemis & Call's:
Adjustable S.40%
Adjustable S Pipe.40%
Bemis Pipe.60%
Briggs Pattern.60%
Combination Black.40&5%
Combination Bright.40%
Merrick Pattern.50%
Boardman's .40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle. 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer.40&10%
Eagle .50&10%
Elgin Wrenches, ₱ doz.$6.2
Elgin Rethreading Attachment, one die, ₱ doz.$6.2
Elgin Extra Dies, ₱ doz.$3.0
Elgin Extra Jaws, ₱ doz.$1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz.$2.10
Gem Pocket .70%
Hercules .70%
W. & B. Machinist:
Case lots.50&5%
Less than case lots.50%
Solid Handles, P., S. & W...50&10@60
Stillson .65%
Vulcan Chain.50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz.$0.80

Wringers—

Tuttle Roller Press Mop Pail Wringer, each, $8.00; ₱ doz.$48.00

Wrought Goods—

Staples, Hooks, &c., list March 17, '92. 90@90&10%

Yokes, Neck—

Covert Saddlery Works, Trimmed..70%
Covert Saddlery Works, Neck Yoke Centers .70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' .list net

Zinc—

Sheet. per 100 lbs., $8.00@8.25

For the Table of "Current Metal Prices" see the First Issue of Every Month.